

**Final Environmental Assessment for the
Joint Integrated Fires Exercise
at Avon Park Air Force Range, Florida**

April 2005

**Prepared by the
Environmental Flight
Avon Park Air Force Range, Florida**

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**Environmental Assessment
at Avon Park Air Force Range, Florida**

Proposed Action: Conduct a Joint Integrated Fires Exercise in May 2005 at Avon Park Air Force Range, Florida

Type of statement: Environmental Assessment

Cooperating agencies: None

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Abstract: The Joint Integrated Fires Exercise (JIFE) trains Tactical Air Controller Parties (TACPs) and Forward Observers (FOs) in coordinating the delivery of ordnance from aircraft, ground artillery, and mortars. While much of the proposed training is routine at Avon Park Air Force Range (APAFR), some elements are new and are assessed this Environmental Assessment (EA). New elements include concurrent use of ordnance delivered by aircraft and ground units, placing TACPs and FOs in explosive impact areas, expanding artillery firing points, creating new mortar firing areas, launching ground-based inert rockets from new locations, and introducing new ordnance into an existing range.

Environmental impacts include adverse impacts to endangered animal species that do not result in lethal take and limiting personnel access to an expanded portion of a high-explosives area of an impact range.

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FINDING OF NO SIGNIFICANT IMPACT

The Environmental Flight at Avon Park Air Force Range (APAFR) has prepared an Environmental Assessment (EA) that conducts the Joint Integrated Fires Exercise (JIFE) at Avon Park Air Force Range, Florida. This analysis was conducted in accordance with the *Regulations For Implementing The Procedural Provisions Of The National Environmental Policy Act* (40 CFR Parts 1500-1508, July 2004) and the *Environmental Impact Analysis Process* (32 CFR 989, July 2003).

1.0 NAME OF THE ACTION

Conduct the Joint Integrated Fires Exercise at Avon Park Air Force Range, Florida.

2.0 DESCRIPTION OF THE PROPOSED ACTION

2.1 Proposed Action

The JIFE trains Tactical Air Controller Parties (TACPs) and Forward Observers (FOs) in advanced and mid-level operations at APAFR. Both operations are conducted from the late afternoon through midnight. Both operations run concurrently during 5-13 May 2005 with the weapon and personnel assets being shared. The weapon platforms that the TACPs and FOs coordinate and direct include fixed-wing (airplanes) and rotary-wing (helicopters) aircraft, howitzers, mortars, and vehicles that launch rockets. Much of the training in the JIFE is currently conducted at APAFR and has been assessed under NEPA. Some portions of the training are either new or expand on existing infrastructure. The new training and expansions are assessed in the EA. The entire exercise is assessed in the Cumulative Impacts section of the EA.

The new training and expansions include the following:

2.1.1 Concurrent use of air and ground-based military assets.

2.1.2 Placing TACPs and FOs in the North Conventional Range, which is a high-explosive impact range, to coordinate and direct air and ground-based delivery of ordnance.

2.1.3 Increasing the annual allotment of high-explosive (HE) Hellfire missiles delivered on the North Conventional Range and increasing the number of inert reduced-range practice rockets (RRPRs) on the North Conventional Range.

2.1.4 Firing howitzers from the Karen Drop Zone for the first time.

2.1.5 Firing vehicle-mounted RRPRs from the existing Oscar Range and from existing artillery Firing Points (FPs) FP 17, FP 18, and FP B-4.

2.1.6 Increasing the size of the existing firing points for howitzers.

2.1.7 Expanding the high-explosive (HE) portion of the South Tactical Range.

2.1.8 Introducing RRPRs into the South Tactical Range for the first time.

2.1.9 Creating two new Mortar Firing Areas (MFAs), the West MFA and the East MFA.

2.2 Alternative A

Alternative A is the same as the Proposed Action with a few exceptions. The exceptions are creating only the West MFA and dropping and firing the howitzers in a different drop zone, the Joan Drop Zone.

2.3 Alternative B

Alternative B is the same as the Proposed Action except that the mortars fire from only the East MFA. The howitzers fire from the same drop zone as in the Proposed Action, the Karen Drop Zone.

2.4 No-Action Alternative

The No-Action Alternative employs only the existing infrastructure and utilizes only training that has been assessed by previous NEPA documents. All units train at APAFR, but they train as single assets independent of each other.

3.0 SUMMARY OF ENVIRONMENTAL IMPACTS

3.1 Proposed Action

The new training and expanded infrastructure that is unique to the Proposed Action directly affects and also indirectly affects the habitat of the Florida Grasshopper Sparrow (FGS), a federally listed, endangered bird species. The direct effect is HE mortars being delivered into FGS habitat in the South Tactical Range. This direct effect is expected to have little impact on FGSs themselves and limited impact on their habitat. Indirect effects are ordnance-created wildfires caused by mortars and RRPRs that are introduced by the JIFE to the South Tactical Range, as well as other inert ordnance delivered in the same impact range used in the JIFE that is commonly used at APAFR and was previously assessed by NEPA. The indirect effect of wildfires is limited due to low fire-fuel loads. Most (about 80%) of the South Tactical Range was either burned in January or February of 2005 or burned within the last year. There are a few areas that have higher than one-year fuel loads, but, if ignited by ordnance, they have limited fire-spread potential.

FGSs are also indirectly affected by ordnance-ignited wildfires created by the JIFE's increase in delivering HE Hellfire missiles, the JIFE's increase in inert RRPR deliveries, and commonly used, previously NEPA-assessed HE artillery ordnance deliveries in the North Conventional Range. The North Conventional Range also has either had recent burns or areas burned within the last year (about 90%). In summary for both impact ranges, the FGS is expected to be adversely affected by the JIFE by harassment only. Lethal takes are not expected and the population of FGSs is not jeopardized.

Expanding the HE impact area for mortars, creating new mortar firing areas, and introducing RRPRs to an existing impact range may potentially adversely affect the vegetation and soils that are included in the FGS habitat, but this impact is not deemed to jeopardize the FGS population.

The threatened Eastern indigo snake has a variety of home ranges and can occur in any of the upland portions of the impact ranges and training areas at APAFR. There is a small potential for direct ordnance effects on the indigo snake. There is a potential for ordnance-ignited wildfire in indigo snake habitat, but research shows that the indigo snake is able to escape fire in most instances. In summary, the JIFE is likely to adversely affect the indigo snake, but the affect results only in an escape response.

The endangered Red-cockaded woodpecker (RCW) bird species does not have habitat directly where the EA assessed elements of the Proposed Action. The RCW does, however, have habitat within the North Conventional Range where an increase in Hellfire missiles are to be fired and in the North Tactical Range where routine ordnance drops will be conducted. The fuel loads around most of the RCW nesting cavity trees are one year or less with little potential for burning. If a fire does carry through a cavity tree area with more than one year of fuel buildup, the affect is non-lethal harassment.

The threatened Florida scrub-jay (FSJ) bird species does not have habitat directly where the EA assessed elements of the Proposed Action. The FSJ does, however, have habitat within the North Conventional Range where an increase in Hellfire missiles are to be fired, the North Tactical Range where routine ordnance drops will be conducted, and in the South Tactical Range where the mortars are introduced and routine ordnance will be dropped. These impacts may cause a wildfire that indirectly, adversely affects the FSJ to include the loss of nests, eggs, or young. This loss is not considered detrimental to the population of FSJs at APAFR. Again, most of these areas have been burned within the last year and present a low potential to be burned from ordnance employed during the JIFE.

Increasing the HE impact area in the South Tactical Range for mortars limits the land use. Personnel are no longer able to access the area unless escorted by Explosive Ordnance Disposal (EOD) personnel. Future ordnance deliveries are limited to HE only.

Mortar fire from newly established firing areas in the southeast portion of the installation creates noise levels off the south edge of the property that typically elicits complaints. The affected area off the installation is in agricultural use with no residential receptors. Noise in this area is considered not be significant.

Noise from the brief, one-day fire event from howitzers in the Karen Drop Zone carries noise into the cantonment area that does not exceed levels that typically elicit complaints. The noise will be heard from human receptors working in the cantonment area, inmates and staff working and living at the Avon Park Correctional Institution, and youth and staff at the Avon Park Youth Academy. Because the noise is brief and below levels that typically elicit complaints, noise in this area is considered not to be significant.

3.2. Alternative A

Impacts from Alternative A are the same as the Proposed Action. Noise impacts in the cantonment area generated from the howitzer fire on the Joan Drop Zone are nearly the same as noise generated from the Karen Drop Zone.

3.3 Alternative B

Impacts from Alternative B are the same as the Proposed Action except that mortar crews avoid the vegetation-study plots by not establishing defensive positions in the West Mortar Firing Area.

3.4 No-Action Alternative

The No-Action Alternative trains only with the existing infrastructure and does not add any new training. There are no impacts. All impacts have been assessed in previous NEPA documents. The value of the training is greatly diminished because joint integrated training is foregone.

4.0 FINDING OF NO SIGNIFICANT IMPACT

The attached EA was prepared and evaluated pursuant to the National Environmental Policy Act (Public Law 91-190, 42 U. S. C. 4321 et seq.) and IAW CFR 32-989 *The Environmental Impact Analysis Process*. Based on the analysis presented in this EA, I conclude that conducting the Joint Integrated Fires Exercise at Avon Park Air Force Range, Florida, as described under the Proposed Action, does not constitute a "major Federal action significantly affecting the quality of the human environment" when considered individually or cumulatively in the context of the referenced act, including both direct and indirect impacts. Also, there are no mitigation measures necessary to implement the Proposed Action. An Environmental Impact Statement (EIS) will not be prepared.

28 APR 05
Date

Michael O. Beale
MICHAEL O. BEALE, Colonel, USAF
Chairperson
20 FW Environmental Leadership Board

Acronyms and Abbreviations

ABS	Archbold Biological Station
ACC	Air Combat Command
AFB	Air Force Base
AGM	Air-to-Ground Missile
AIRFA	American Indian Religious Freedom Act
APAFR	Avon Park Air Force Range
ASOG	Air Support Operations Group
ATGM	Anti-Tank Guided Missile
BDU	Bomb Dummy Unit
CFR	Code of Federal Regulations
CZMA	Coastal Zone Management Act
dB	Decibel
DNL	Day-Night Average Sound Level
DoD	Department of Defense
DPP	Documented Panther Populations
DUC	Deployment Unit Complex
DZ	Drop Zone
EA	Environmental Assessment
EIS	Environmental Impact Statement
ERP	Environmental Restoration Program
ESA	Endangered Species Act
ESMP	Endangered Species Management Plan
FGS	Florida Grasshopper Sparrow
FLARNG	Florida Army National Guard
FP	Firing Points
FDEP	Florida Department of Environmental Protection
FFWCC	Florida Fish and Wildlife Conservation Commission
FSJ	Florida Scrub-Jay
HE	High Explosive
HIMARS	High Mobility Artillery Rocket System
HMMWV	High Mobility Multipurpose Wheeled Vehicle
HQ	Headquarters
IAW	In Accordance With
Illum	Illumination
INRMP	Integrated Natural Resources Management Plan
JIFE	Joint Integrated Fires Exercise
TACP	Tactical Air Controller Party
FO	Forward Observer
GAO	Government Accounting Office
mm	Millimeter
MFA	Mortar Firing Area
MP	Mortar Points
NAGPRA	Native American Graves Protection and Repatriation Act

NEPA National Environmental Policy Act
NRHP National Register of Historic Places
NRIS National Register Information System
OP Observation Point
RCW Red-Cockaded Woodpecker
ROI.....Region of Influence
RRPR Reduced-Range Practice Rocket
RTRB Realistic Training Review Board
SDZ..... Surface Danger Zone
SHPO State Historic Preservation Officer
SUV.....Sport Utility Vehicle
TOC..... Tactical Operations Center
TRI-DDS Toxic Release Inventory Data Delivery System
US United States
USACOE..... United States Army Corp of Engineers
USC.....United States Code
USDA..... United States Department of Agriculture
USFS United States Forest Service
USFWS United States Fish and Wildlife Service
USN..... United States Navy
UXO..... Unexploded Ordnance
WP..... White Phosphorus

TABLE OF CONTENTS

1.0 PURPOSE OF AND NEED FOR ACTION	1
1.1 INTRODUCTION	1
1.2 BACKGROUND	1
2.0 DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES	4
2.1 PROPOSED ACTION	4
2.1.1 DESCRIPTION OF THE EXERCISE AND ASSETS	4
2.1.2 DESCRIPTION OF THE OPERATIONS	10
2.1.3 JIFE TRAINING THAT IS NEW TO APAFR, PROPOSED ACTION	17
2.2 ALTERNATIVE A	19
2.3 ALTERNATIVE B	19
2.4 NO-ACTION ALTERNATIVE	19
2.4.1 ADVANCED OPERATIONS	19
2.4.2 MID-LEVEL OPERATIONS	19
3.0 AFFECTED ENVIRONMENT	20
3.1 AIRSPACE AND AIRCRAFT OPERATIONS	20
3.2 SAFETY	20
3.3 NOISE	20
3.4 HAZARDOUS MATERIALS AND WASTE	21
3.5 ENVIRONMENTAL RESTORATION	21
3.6 AIR QUALITY	22
3.7 GEOLOGY AND SOILS	22
3.8 WATER RESOURCES	23
3.9 VEGETATION	25
3.9.1 FEDERALLY LISTED PLANT SPECIES AT APAFR	25
3.9.1.1 PIGEON WING (<i>Clitoria fragrans</i>)	26
3.9.1.2 HAIRY JOINTWEED (<i>Polygonella basiramia</i>)	26
3.10 FISH AND WILDLIFE	28
3.10.2 FEDERALLY LISTED WILDLIFE SPECIES AT APAFR	28
3.10.2.1 FLORIDA GRASSHOPPER SPARROW	28
3.10.2.2 RED-COCKADED WOODPECKER	30
3.10.2.3 WOOD STORK	30
3.10.2.4 FLORIDA PANTHER	30
3.10.2.5 FLORIDA SCRUB-JAY	31
3.10.2.6 AUDOBON'S CRESTED CARACARA	31
3.10.2.7 BALD EAGLE	31
3.10.2.8 EASTERN INDIGO SNAKE	31
3.11 GRAZING MANAGEMENT	32
3.12 INVASIVE-PLANT MANAGEMENT	32
3.13 TIMBER MANAGEMENT	32
3.14 RECREATION	32
3.15 MILITARY TRAINING	32

TABLE OF CONTENTS CONTINUED

3.15.1	RESOURCE DEFINITION	32
3.15.2	EXISTING CONDITIONS.....	32
3.16	CULTURAL RESOURCES	33
3.16.1	DEFINITION OF THE RESOURCE	33
3.16.2	EXISTING CONDITIONS.....	33
3.17	SOCIO-ECONOMIC RESOURCES	35
3.18	COASTAL MANAGEMENT ZONE.....	35
3.19	WILDLAND FIRE AND PRESCRIBED BURNING	35
4.0	ENVIRONMENTAL CONSEQUENCES	39
4.1	AIRSPACE AND AIRCRAFT OPERATIONS	39
4.2	SAFETY	39
4.3	NOISE.....	39
4.3.1	PROPOSED ACTION	39
4.3.2	ALTERNATIVE A	40
4.3.3	ALTERNATIVE B	40
4.3.4	NO-ACTION ALTERNATIVE.....	40
4.4	HAZARDOUS MATERIALS AND WASTE	40
4.5	ENVIRONMENTAL RESTORATION	40
4.6	AIR QUALITY	41
4.7	GEOLOGY AND SOILS	41
4.8	WATER RESOURCES	42
4.8.1	PROPOSED ACTION	42
4.8.2	ALTERNATIVE A AND B.....	42
4.8.3	NO-ACTION ALTERNATIVE.....	43
4.9	VEGETATION	43
4.9.1	HAIRYJOINT WEED	44
4.9.2	PIGEONWING	44
4.10	FISH AND WILDLIFE SPECIES	44
4.10.1	FLORIDA GRASSHOPPER SPARROW	44
4.10.2	RED-COCKADED WOODPECKER	46
4.10.3	WOOD STORK.....	47
4.10.4	FLORIDA PANTHER.....	47
4.10.5	FLORIDA SCRUB JAY	47
4.10.6	CRESTED CARACARA.....	48
4.10.7	BALD EAGLE.....	48
4.10.8	EASTERN INDIGO SNAKE	49
4.11	GRAZING MANAGEMENT.....	49
4.12	INVASIVE PLANT MANAGEMENT	49
4.13	TIMBER MANAGEMENT.....	49
4.14	RECREATION	49
4.15	MILITARY TRAINING.....	50
4.16	CULTURAL RESOURCES	50
4.16.1	PROPOSED ACTION	50

TABLE OF CONTENTS CONTINUED

4.16.2	ALTERNATIVE A	50
4.16.3	ALTERNATIVE B	50
4.16.4	NO-ACTION ALTERNATIVE.....	50
4.17	SOCIO-ECONOMIC RESOURCES.....	51
4.18	COASTAL ZONE MANAGEMENT.....	51
4.19	WILDLAND FIRE AND PRESCRIBED BURNING	51
4.20	ENVIRONMENTAL JUSTICE	52
4.21	CUMULATIVE IMPACTS.....	53
4.22	SHORT-TERM USE AND LONG-TERM PRODUCTIVITY.....	54
4.23	IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES	54
4.24	DIRECT AND INDIRECT EFFECTS	54
5.0	REFERENCES CITED	55
6.0	AGENCIES AND PUBLIC CONTACTED	60
7.0	LIST OF PREPARERS	62
8.0	GLOSSARY	64
APPENDIX A: JIFE NOISE LEVELS - 155 MM HOW, 81/ 120 MM MORTAR		66
APPENDIX B: RECORD OF CONSULTATION		67

LIST OF TABLES

<u>Table</u>	<u>Page</u>
2.1.1-1	Weapon Assets for Advanced and Mid-level Operations6
2.1.2-1	Ordnance Delivered by Asset for the Advanced Operations14
2.1.2-2	Ordnance Delivered by Asset for the Mid-level Operations15
3.10.2-1	Federally Listed Wildlife Species at APAFR28
3.10.2-2	Florida Grasshopper Sparrow Populations28
4.10-1	Potential Impacts to Federally Listed Animal and Plant Species44
4.16.1-1	Effects and Recommendations for Cultural Resources51

LIST OF FIGURES

<u>Figure</u>	<u>Page</u>
1.2-1	Avon Park Air Force Range's Location in Florida.....2
2.1.1-1	The Location of the Advanced and Mid-Level Operations on the North Tactical, North Conventional, and South Tactical Ranges at Avon Park Air Force Range, Florida5
2.1.1-2	The Location of Ground Assets in the Advanced Operations8
2.1.1-3	The Location of the Mortar Firing Areas for the Mid-level Operations.....9
2.1.1-4	The HIMARS Firing Locations on the Oscar Range.....10
2.1.2-1	Targets, Observation Points, and the Convoy Route on the North Conventional and Tactical Ranges.....12
2.1.2-2	Observation Points and Surface Danger Zones in the South Tactical Range16
3.10.1.2-1	The Locations of <i>Clitoria fragrans</i> and <i>Polygonella basiramia</i> at Avon Park Air Force Range, Florida27
3.19-1	Recently Burned and Low Burning Potential Locations for the North Conventional and North Tactical Ranges37
3.19-2	Recently Burned and Low-Burn-Potential Locations for the South Tactical Range38

1.0 PURPOSE AND NEED FOR ACTION

1.1 INTRODUCTION

The 18th Air Support Operations Group (18 ASOG) proposes to introduce a Joint Integrated Fires Exercise (JIFE) to Avon Park Air Force Range (APAFR) during 5-13 May 2005. The purpose of the JIFE is to jointly train fixed-wing aircraft (airplanes), rotary-wing aircraft (helicopters), ground artillery, small groups of ground-based Tactical Air Controllers (TACPs), and Forward Observers (FOs). The emphasis of the exercise is coordinating the delivery of ordnance from aircraft and artillery by TACPs and FOs for a combined arms effect. While many aspects of this training currently occur at APAFR, the JIFE is the first exercise to combine all assets in a joint exercise at this magnitude. The JIFE also introduces certain types of inert (non-explosive) ordnance and high-explosive (HE) ordnance to a particular range at APAFR.

The need for such training is based on recent conflicts during Operation Iraqi Freedom and Operation Enduring Freedom. These operations required joint integrated fire from the Air Force, Army, Navy, Marines, and coalition forces. The JIFE replicates current battle situations. The application of the JIFE is broad in that it can be used in small-to-large combat situations and in a variety of terrains, including high-density urban areas. Furthermore, the JIFE trains to improve the integration deficiencies found the Government Accounting Office's (GAO) *Military Operations: Recent Campaigns Benefited from Improved Communications and Technology, but Barriers to Continued Progress Remain* (GAO-04-547) and in the Realistic Training Review Board's (RTRB) reviews in RTRB 02-1 and 02-2.

Important factors used to determine dates for the proposed exercise are the probability of good flying weather and relatively dry ground. Use of the 5-13 May dates was also dictated by the availability of participating exercise assets.

The JIFE is a complex exercise and new to APAFR. For this reason, some aspects of the training that were originally considered are being omitted until after the first exercise is completed and evaluated. Following the evaluation, continuance of the JIFE will be considered, and, if a determination to go forward with continued training is made, the original assets that were omitted will be reconsidered. This EA, therefore, assesses only the initial exercise during 5-13 May 2005. The long-term impact of continued training and other assets added to training will be assessed in a future EA.

1.2 Background

Avon Park Air Force Range (APAFR) is located in Polk and Highlands Counties in central Florida (Figure 1.2-1). The range complex covers approximately 106,073 acres and is about ten miles east of Avon Park and 15 miles northeast of Sebring, Florida. The major roads serving the range are US Highway 27 and County Road 64.

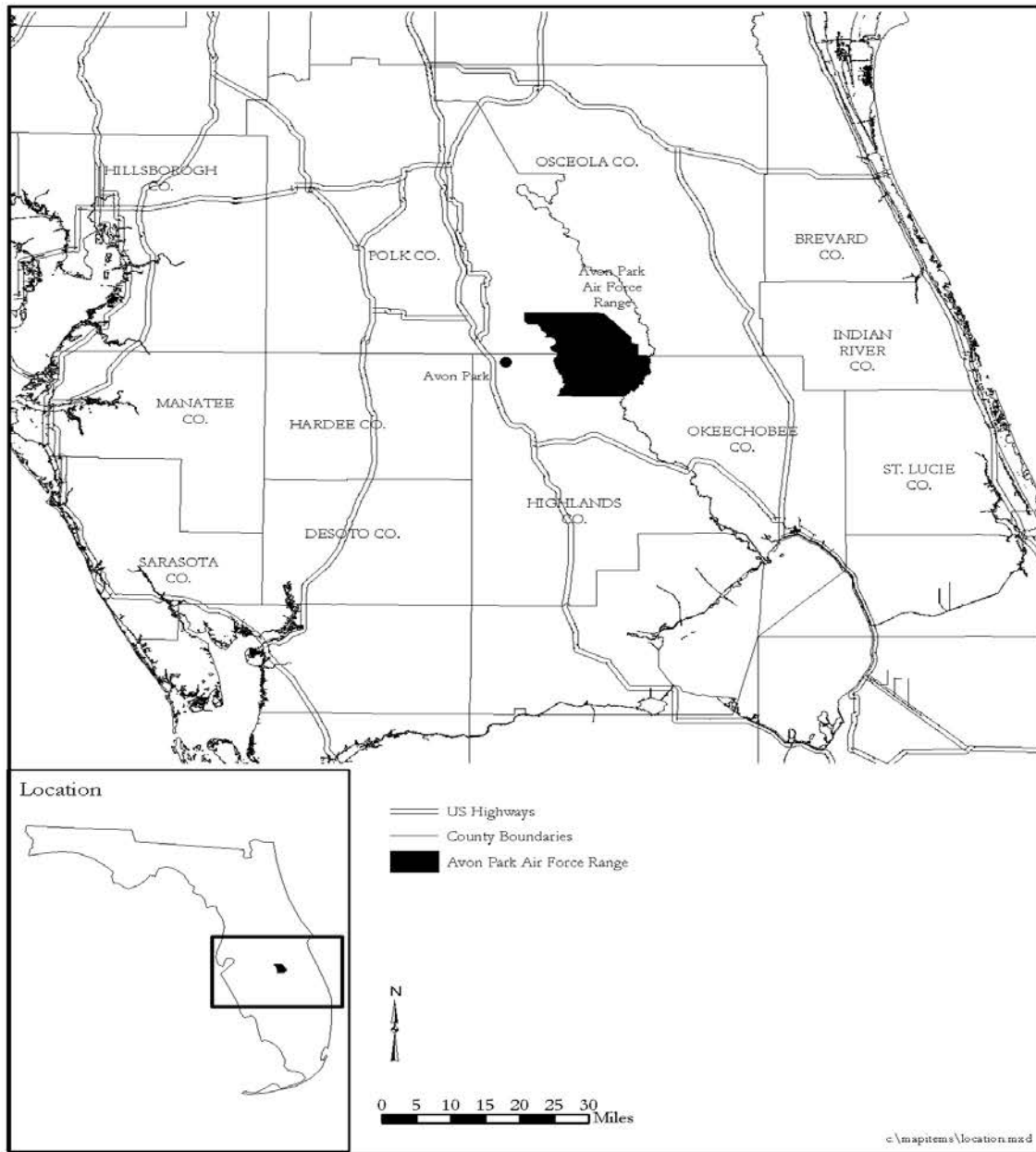


Figure 1.2-1 Avon Park Air Force Range's Location in Florida.

APAFR is the largest Air Force bombing and gunnery range east of the Mississippi River. The mission of APAFR is to provide a training infrastructure that allows US air and ground forces to practice the latest combat training techniques and procedures safely, efficiently, and realistically and to design training facilities that meet training needs. The 18th Air Support Operations Group (ASOG) at Pope Air Force Base, North Carolina, is responsible for operating APAFR, while installation command responsibility is held by the 20th Fighter Wing at Shaw AFB, South Carolina. These units are elements of Air Combat Command (ACC). The range is used for bombing practice by US Air Force units from throughout the southeast.

Several previous Environmental Assessments (EAs) for APAFR have assessed many aspects of the JIFE training. Therefore, while the Proposed Action, Alternatives A and B, and the No-Action Alternative are described in detail, not all aspects of the Proposed Action, Alternatives A and B, and the No-Action Alternative are assessed in this EA because an assessment following the NEPA procedure has already been performed. For example, the environmental assessment *Conversion of the 8-Inch Howitzer Weapon System to the Multiple Launch Rocket System in the Florida Army National Guard, 3rd Battalion, 116th Field Artillery* (CH2MHill 1996) assessed the impacts of launching inert reduced-range practice rockets (RRPRs) from established firing points (FPs) into the North Tactical and North Conventional Ranges. The JIFE launches the same RRPRs into the North Tactical Range, so this activity is not assessed in this EA. However, the JIFE increases the number of RRPRs fired, changes the locations of where the RRPRs are fired from, and for the first time fires RRPRs into a third range, the South Tactical Range. These aspects of the JIFE training have not been assessed in previous EAs and are therefore assessed in this EA. Previous EAs that have assessed aspects of the JIFE training include:

- *Conversion of the 8-Inch Howitzer Weapon System to the Multiple Launch Rocket System in the Florida Army National Guard, 3rd Battalion, 116th Field Artillery* (CH2MHill 1996) assessed and determined no significant impact from launching inert RRPRs into the North Tactical and North Conventional Ranges. This EA also considered the cumulative effects of existing training for artillery and mortars delivering HE ordnance in the North Conventional Range.
- *Final Environmental Assessment for 1st Battalion, 75th Ranger Regiment Fixed Wing Bilateral Training Exercise at Avon Park Air Force Range, Florida* (USAF 1998) assessed and determined no significant impact from firing 20 millimeter (mm) and 40mm HE at a designated target in the South Tactical Range from cannons mounted on AC-130 gunships (fixed-wing aircraft) and ground forces firing a 40mm grenade launcher. This EA effectively created an HE area in the South Tactical Range.
- *Final Environmental Assessment for Construction of Military Operations in Urban Terrain Target Arrays at Avon Park Air Force Range, Florida* (USAF 2001) assessed and determined no significant impact from air-delivered inert ordnance and helicopter gunnery on targets within mock urban villages located on the North and South Tactical Ranges.
- *Environmental Assessment for High Explosive Ordnance Delivery from AC-130 Aircraft at Avon Park Air Force Range* (USAF 1997a) assessed and determined no significant

impact from the delivery of 20, 40, and 105mm HE ordnance from cannons mounted on AC-130 gunships at a target set up in the North Conventional Range.

- *Environmental Assessment for Hellfire Missile/Aerial Gunnery Training at Avon Park Air Force Range, Florida* (USAF 1994) assessed and determined no significant impact from firing Hellfire rockets from rotary-wing aircraft at a target in the North Conventional Range.

Aside from some discussion in Section 4.10.5 Florida scrub-jay, this EA does not assess the impacts of the JIFE training when the JIFE training follows the training that is described in the *Plan for the Management of the Florida Grasshopper Sparrow, Florida Scrub-jay, and Red-cockaded Woodpecker at Avon Park Air Force Range* (USAF 2001a).

2.0 DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

2.1 Proposed Action

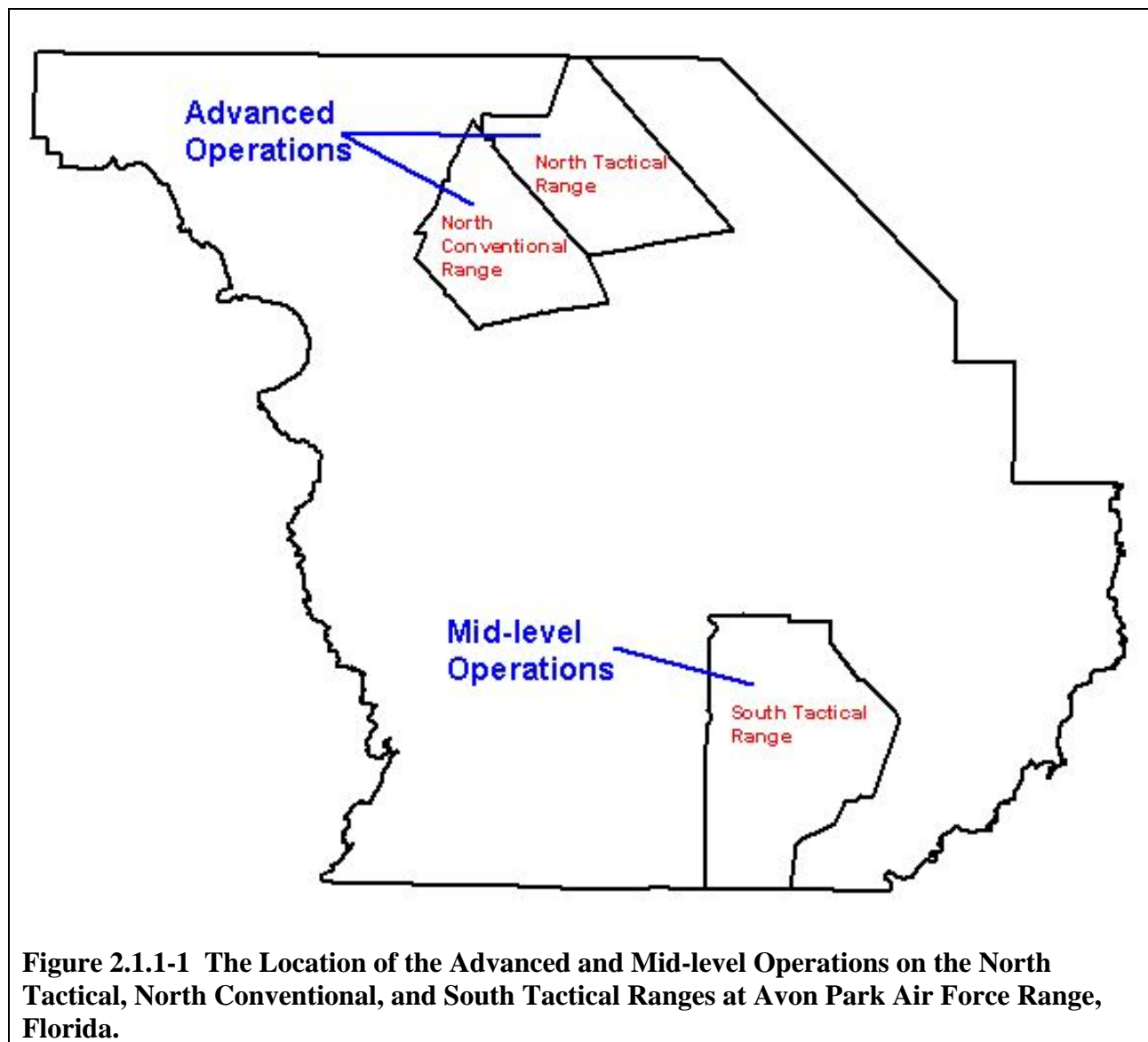
2.1.1 Description of the Exercise and Assets

The proposed action entails two sets of training operations. The first set is called the Advanced Operations and takes place in the North Conventional and North Tactical Ranges, while the second set is called the Mid-level Operations and takes place in the South Tactical Range (Figure 2.1.1-1). Both operations are conducted from the late afternoon through midnight. Both operations run concurrently during 5-13 May 2005 with the weapon and personnel assets being shared. The type and number of weapon assets are listed below in Table 2.1.1-1. Brief descriptions of each weapon asset are found in the glossary.

Preparation is required for both the Advanced and Mid-level Operations prior to the actual field combat exercise. Advance parties arrive at APAFR on 5 May 2005 to prepare and ensure that the infrastructure is in place to accommodate the main body of units that arrives during 6-7 May. The advance party contains approximately 50 people. They ensure that lodging, food service, sanitation, communications, safety, and accounting are organized and that the airfield, airspace, ranges, landing zones, firing points, and road networks are available and serviceable for the exercise. During 6-7 May, the following assets (with approximate respective personnel and vehicles) stage at the APAFR airfield, the MacDill Deployment Unit Complex (DUC) at MacDill Air Force Base in Tampa, Florida, or at their respective home stations.

APAFR Airfield:

- Six (6) A-10 Thunderbolts with twenty-two (22) crew members and twenty-five (25) operational and support personnel. There are approximately ten (10) wheeled support vehicles consisting of high-mobility multipurpose wheeled vehicles (HMMWVs) and cargo trucks.



- Eight (8) AH-1 Cobra and four (4) UH-1N Huey helicopters with twenty-four (24) crew members and fifty support personnel. Ten (10) multipassenger vans and cargo trucks.
- Four (4) 81mm mortars and four (4) 120mm mortars with twenty-four (24) crew members and twenty-five (25) operational and support members. There are approximately eight (8) support vehicles consisting of HMMWVs and cargo trucks.

Table 2.1.1-1. Weapon Assets for Advanced and Mid-level Operations

ASSET	NUMBER	ASSET	NUMBER
<u>FIXED-WING</u>		<u>GROUND-BASED</u>	
A-10	6	81mm Mortars	4
AC-130	1	120mm Mortars	4
F-15E	4	155mm Howitzers	6
F-16	4	HIMARS	6
B-2	1	TACP Personnel	20
		FO Personnel	15
<u>ROTARY-WING</u>			
AH-1W	8		
UH-1N	4		

APAFR Airfield continued:

- Six (6) rubber-tired rocket launchers called high-mobility artillery rocket systems (HIMARS) with eighteen (18) crew members and forty (40) operational and support personnel. There are approximately twenty (20) support vehicles consisting of HMMWVs, cargo trucks, and large-rocket reloading wheeled trucks.
- Six (6) 155mm howitzers with twenty (20) crew members and twenty (20) operational and support personnel. There are approximately twenty (20) support vehicles consisting of HMMWVs, cargo trucks, and large trucks that tow the howitzers.
- Ten (10) pairs of TACPs and fifteen (15) individual FOs for a total of thirty-five (35) people and five (5) multipassenger vans and four (4) sport utility vehicles (SUVs).
- One (1) central operational command post located in the airfield hanger with approximately ten (10) people and five (5) support vehicles consisting of passenger SUVs.

MacDill Deployment Unit Complex:

- Four (4) F-15E Strike Eagles with four (4) crew members.

From Their Respective Home Stations:

- Four (4) F-16 Falcons with four (4) crew members.
- One (1) AC-130 Spectre gunship with twelve (12) crew members.
- One (1) B-2 Spirit bomber with four (4) crew members.

There are additional support people and vehicles for the fixed-wing aircraft at the MacDill DUC and at the home stations, but this support is no different from current ongoing operations and therefore is not analyzed nor assessed in this EA.

Assets, personnel, and vehicles are either flown in, transported onto, or driven to APAFR and staged on the airfield. The one exception is that two of the 155mm howitzers and their respective gun crews are not staged at the airfield, but air-dropped into the Karen Drop Zone (DZ) on 7 May.

During 7-8 May, the ground-weapon assets leave the airfield and establish positions in the field. Four of the 81mm mortars set up either in existing mortar-firing points two or three (MP2 and MP3) located just south of the North Conventional Range (Figure 2.1.1-2) or in either of the new mortar-firing-point areas West MFP or East MFP (Figure 2.1.1-3). Likewise, four 120mm mortars occupy MP2, MP3, or the West MFP or East MFP mortar-firing-point areas. Ultimately, the two mortar platoons will not be in the same geographic area so that MP2 or MP3 is occupied and either the West MFP or East MFP is occupied. Two 155mm howitzers with their respective gun crews are air-dropped into the Karen DZ on 7 May. The guns are dropped in any location in the northern half of the DZ, while the crews are dropped anywhere within the DZ. The two howitzers are unloaded by hand from their air-drop pallets. The howitzers are placed for firing adjacent to where they land due to their large size. The remaining four howitzers are towed by large trucks from the airfield and placed in any one of the firing points (FPs) FP8 - FP12, FP14, and FP19 - FP22. The HIMARS consist of six rocket launchers that are split into two platoons of three rocket launchers each. One platoon occupies any location on the paved surface road, strafe run-in lines, or the strafe pad on Oscar Range. The second platoon occupies a field location in any one firing point for FPB-4, FP17, and FP18. Both the 155mm howitzers and the HIMARS establish tactical operation centers (TOCs). The TOCs are located in any listed firing point or on the land features noted in Oscar Range. The TOC consists of several operational vehicles grouped together with tents and camouflage concealment. The TOCs also require the use of generators. The TOCs serve as unit command posts that communicate and coordinates between the central command post and the howitzers or rocket launchers.

Also during 6-8 May, the supplies and infrastructure for the exercise, as well as the central command post located in the hanger, are assembled on the airfield. The supplies include fuel, ammunition and ordnance, food, water, sanitation, support vehicles, communication and technological equipment, and tools and equipment for vehicles and weaponry. The ammunition is placed in two locations on the airfield. The bulk of the ammunition and ordnance is located in one location on the airfield and at a sufficient distance to safely allow normal and exercise specific duties to be performed on the airfield. The second location is for the smaller caliber ammunition that is stored in stationary, secured ammunition bunkers on the airfield. The ammunition and ordnance is under a 24-hour armed guard. The aircraft assets at APAFR are armed and prepared for the exercise. Mobile fuel trucks for aircraft are on the airfield and set up for secondary containment while fueling. Existing fuel for ground vehicles consist of above-ground storage tanks located in the cantonment area that are adjacent to and north of the airfield. Also, mobile fuel trucks are available for refueling vehicles in the field – again secondary containment is provided for. Food is provided for by a self-contained food service unit located in the cantonment area of the airfield. Breakfast and supper is served: lunches are carried in the field.

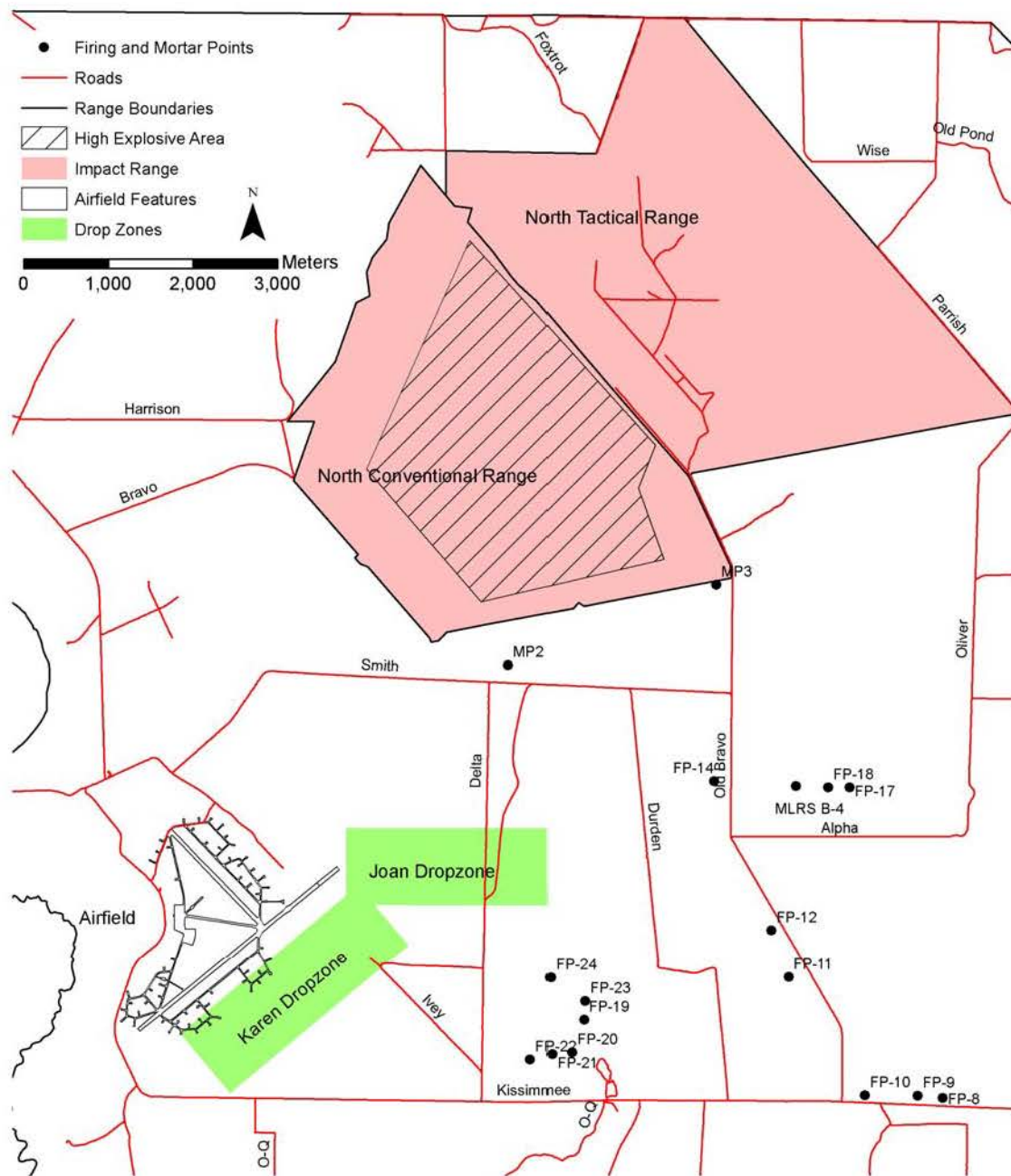
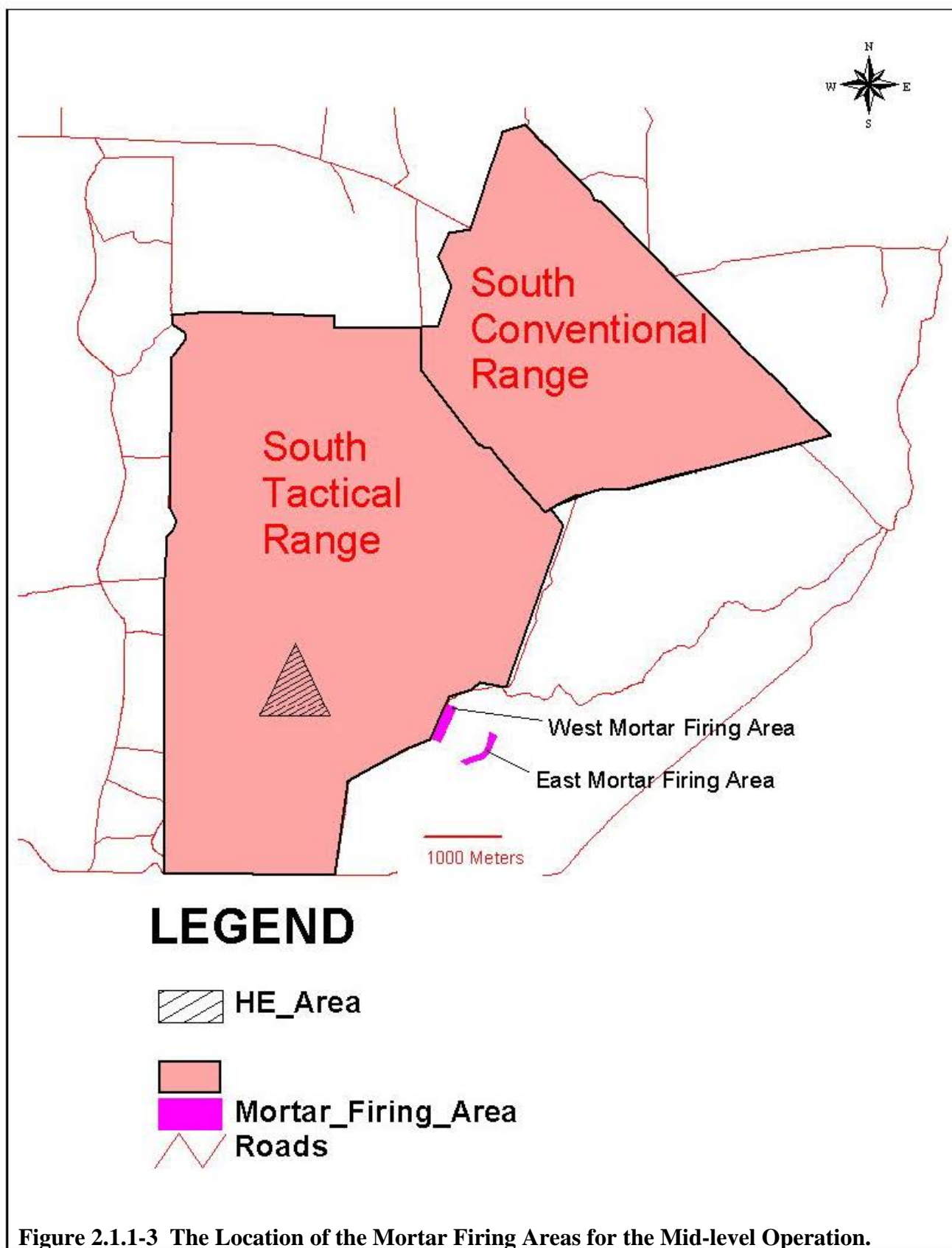


Figure 2.1.1-2 The Location of Ground Assets in the Advanced Operations.



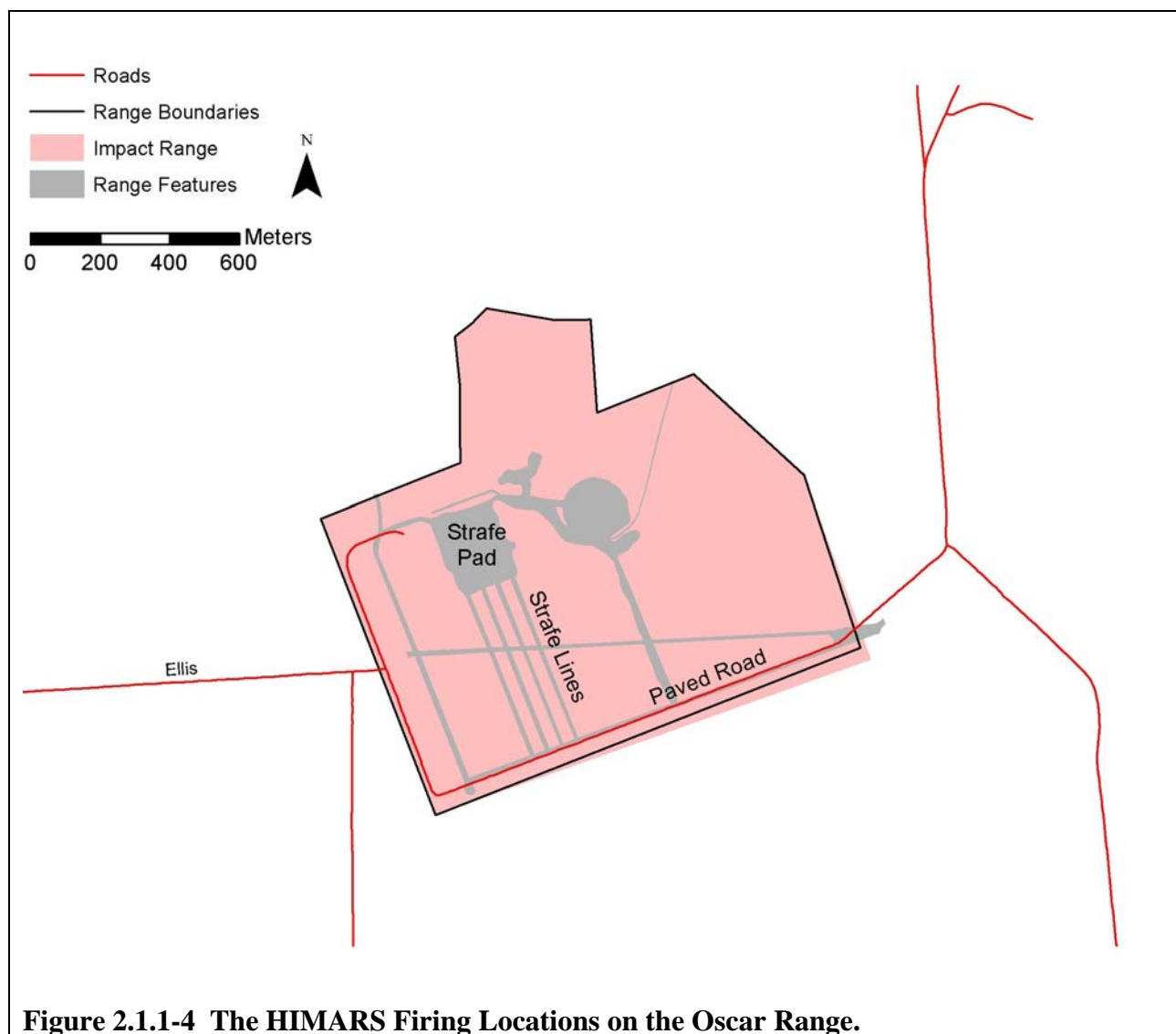


Figure 2.1.1-4 The HIMARS Firing Locations on the Oscar Range.

2.1.2 Description of the Operations

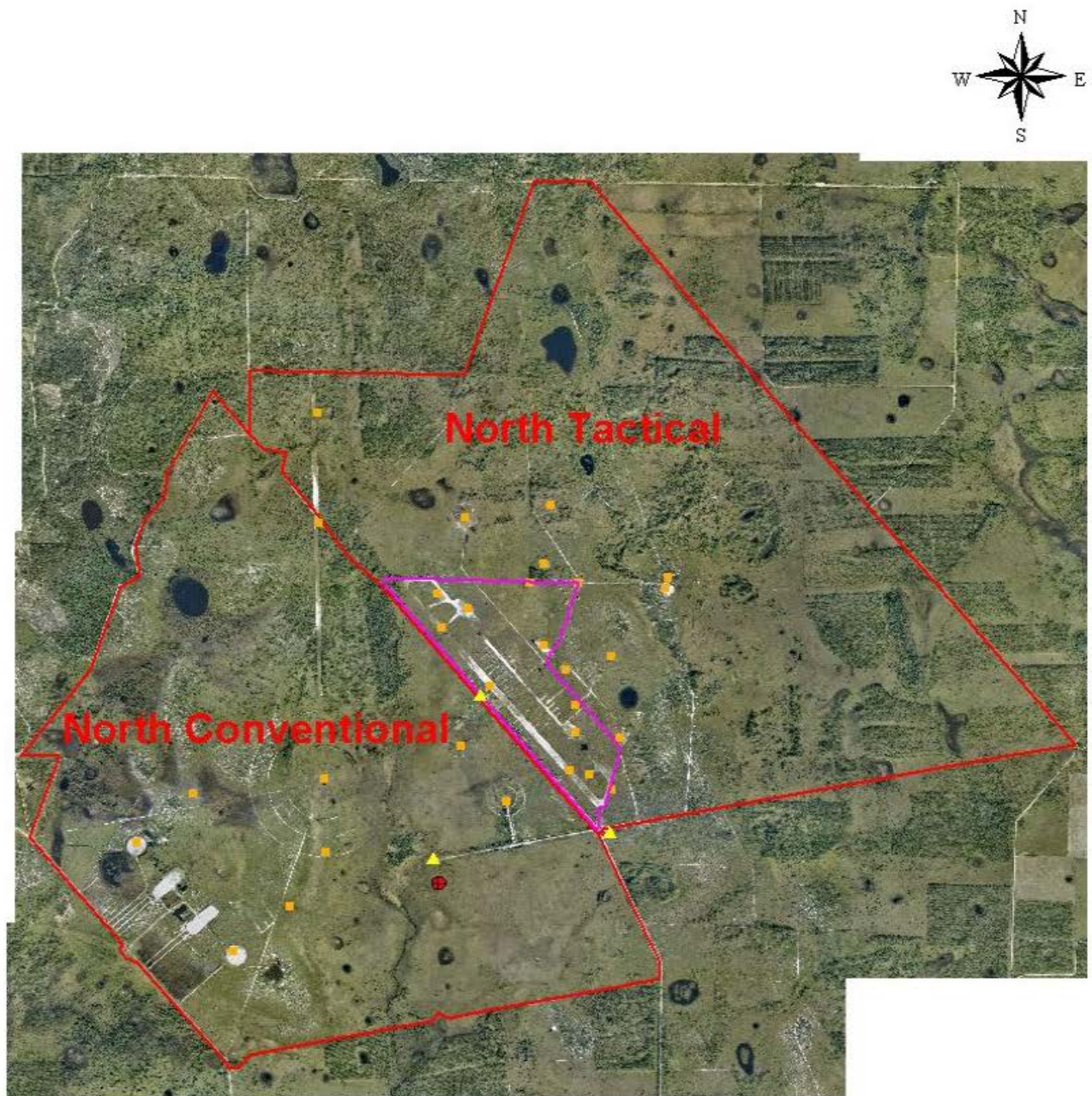
The operational portion of the exercise takes place from 9-12 May. The operational exercises occur from 2:00 p.m. to midnight (1400-2400) with the assets retiring for the night by 1:00 a.m. (0100). On 9 May, the participants meet on the airfield in the morning and are briefed for the upcoming exercise-training scenario. The first set of operational exercises are carried out and completed by 2400 on 9 May. On 10 May, the participants are debriefed on the 9 May exercise and briefed for the upcoming 10 May exercise. The same debriefing/briefing occurs on 11 and 12 May. On 13 May, the operational exercise is complete and the assets depart APAFR and the MacDill DUC. The following are detailed scenario descriptions for both the Advanced Operations and Mid-level Operations.

Advanced Operations:

On 9 May, the Advanced Operations places the TACPs and FOs on static observation points and on any building within the mock village located in the North Conventional and North Tactical Ranges (Figure 2.1.2-1). These positions allow the TACPs and FOs to observe the targets in both ranges. From these locations, the TACPs and FOs are given the training scenario via radio communication. The scenarios include the availability of air (rotary- and fixed-wing) and ground (artillery, mortar, and rocket) assets at any given time along with the current activity and location of hypothetical opposition forces located in the ranges. With this information, the TACPs and FOs prioritize opposition targets and coordinate the available assets to deliver ordnance to the targets - all under strict time constraints and at the same time regarding airspace and ground safety. The first half of the 9 May scenario limits the TACPs and FOs to no more than two asset types at any one time. Typical examples may be F-16s and F-15Es, A-10s with 81mm mortars, and the B-2 and HIMARS. The second half of the 9 May scenario allows for multiple asset types at any one time. The 10-12 May scenario calls for multiple assets and allows the TACPs and FOs to observe and coordinate attacks from dynamic field positions in SUVs following a convoy route. After the conclusion of the exercise for each night, the TACPs and FOs depart the ranges and retire to the dorms and food service unit at APAFR or hotels and restaurants in the local vicinity.

Aircraft assets expend their ordnance and bullets into the North Conventional and North Tactical Ranges as directed by the TACPs. The air assets target existing targets with existing and approved run-in headings and ordnance delivery methods. This procedure continues from 9-12 May. They travel back to the APAFR airfield, the MacDill DUC, or their home stations for rearmament and refueling to prepare for the next operational exercise. When the exercise is completed for any given evening, the aircraft and associated support vehicles are kept on the APAFR airfield or the MacDill DUC. For aircraft and their respective assets at APAFR, the personnel are housed in the dorms and fed at the mobile food unit at APAFR or housed at hotels and fed at restaurants in the local vicinity.

The ground assets are also active as these resources are called upon by the FOs. Mortars in either MP2 or MP3 conduct indirect fire at targets in the North Conventional Range during the exercise. As the exercise progresses, the mortars move back and forth between MP2 and MP3. Approximately halfway through the exercise, the mortars that have been on MP2 and MP3 move south to the West MFP and East MFP under the Mid-level Operation, while the mortars in the West MFP and East MFP move north to MP2 and MP3. On 9 May, the two 155mm howitzers in the Karen DZ fire up to eight rounds each into the North Conventional Range, then they are towed by heavy trucks from the Karen DZ to a tank trail located near the northeast corner of the DZ. From there, the howitzers are towed southeast on the tank trail until they reach Kissimmee Road. The howitzers travel east on Kissimmee Road until they reach either the tank trail network that accesses FPs 19-24 or the tank trail that accesses FPs 9-12. The two howitzers join the other four howitzers at one of the FPs and continue to conduct fire as requested by the FOs. The six howitzers remain together for the rest of the exercise. The HIMARS fire RRPRs from Oscar Range into the North Conventional Range. The exercise continues during 9-12 May. The mortar, howitzer, and HIMARS personnel are supplied with food, water, and ammunition by vehicle convoy during the exercise. The convoy picks up the materials on the airfield and transports the



LEGEND

- Targets
- Impact_Range
- ▲ Observation Point
- Convoy Route
- Hellfire Target

Figure 2.1.2-1. Targets, Observation Points, and the Convoy Route on the North Conventional and Tactical Ranges.

supplies to the ground assets in the field. The convoy remains on signed roads, tank trails, and firing points. The mortars and howitzers are re-supplied at their firing points. Because the HIMARS ammunition trucks require a wide turning radius, the HIMARS rocket launchers meet the ammunition trucks for resupply on a road or tank trail. Also, the rocket launchers and trucks that tow the howitzers are refueled at least one time in the field. Refueling is done with secondary containment. Both the 155mm howitzers and the HIMARS are dynamic with their firing positions. They relocate to any previously listed firing point or within Oscar Range at any time during 9-12 May. Also, the two HIMARS platoons switch locations about half way through the exercise with one platoon leaving the FP17, FP18, and FP B-4 area and going to Oscar Range, while the other platoon leaves Oscar Range and travels to FP17, FP18, and FP B-4 area. The mortar, howitzer, and HIMARS crews bivouac on site with their weapons. For the mortar and howitzer crews, hasty small-arms defensive positions are established by digging shallow positions (one-foot deep) and placing sand bags adjacent to the excavations. These defensive positions are limited in size to accommodate the gun crew members only. These positions are filled in when the unit leaves the firing point. No sanitation is provided for the mortar, howitzer, and HIMARS crews. Each individual crew member buries solid waste in a shallow hole. Leftover powder from the mortars and howitzers is ignited and burned on the ground in the vicinity of where they have fired. This is done on bare ground, typically a tank trail or fire-break disk line, to reduce the risk of causing a wildfire.

All of the assets that have been previously listed are available to the TACPs and FOs for the Advanced Operations. All of the hypothetical opposition targets are existing targets. All of the ordnance delivered by the assets to the targets have been used and are approved for use at APAFR. The exception is for the RRPRs from the HIMARS – this ordnance has been approved, but has not been used in the North Conventional Range. All of the ordnance has been assessed for use at APAFR by the NEPA process. All air operations deliver ordnance within airspace R-2901A or R-2901B. These restricted-area airspaces allow for ordnance deliveries from ground level to 18,000 feet above mean sea level. Ordnance delivered by asset to the North Conventional and North Tactical Ranges during the Advanced Operations is listed in Table 2.1.2-1. The B-2 does not deliver ordnance during the JIFE, but participates in the Advanced and Mid-level Operations in all other respects.

The following are descriptions of the ordnance. The 7.62mm ball and tracer consists of a standard bullet, called a ball, and a specially designed bullet that causes friction as it passes through the air – called a tracer round. The friction leaves a light trail that helps the firer in acquiring the target. Millimeter (mm) after each number is the cross-sectional diameter of the round: the larger the mm number, the larger the round. A bullet is a solid, non-exploding round. High Explosives (HE) are explosive ammunition rounds that fragment. All HE rounds in this exercise are impact- detonated, meaning that they explode immediately upon impacting the target or ground. Illuminations (Illum) are rounds that detonate as a flare in the air and illuminate the ground below. White Phosphorus (WP) is an explosive round that chemically creates smoke when exposed to atmospheric oxygen. This is typically accomplished when the round impacts the ground or target. The smoke is intense heat that is used to ignite a fire on the target. Fuel and ammunition depots are commonly targeted by WP ordnance. Bomb, Dummy Unit (BDU), is a free-falling bomb that is inert, meaning that it contains no explosive. It contains a very small charge of WP that is used to help the firer and ground controller see and mark where the BDU hit

in relation to the target. Hellfire rockets are anti-tank guided missiles (ATGM). Inert Hellfires have a small WP spotting charge to help the firer see and mark where the rocket hits, while HE

Table 2.1.2-1. Ordnance Delivered by Asset for the Advanced Operations

ORDNANCE	ASSET	NORTH RANGE
7.62mm ball and tracer	AH-1W and UH-1N	Tactical and Conventional
20mm bullet	F-15E and F-16	Tactical and Conventional
25mm bullet	AC-130	Tactical
30mm bullet	A-10	Tactical
20mm HE	AC-130	Conventional
40mm HE	AC-130	Conventional
81mm HE, Illum, WP	Mortar	Conventional
120mm HE, Illum, WP	Mortar	Conventional
105mm HE	AC-130	Conventional
155mm HE and Illum	155mm Howitzer	Conventional
RRPR	HIMARS	Tactical and Conventional
BDU	F-15E, F-16, A-10	Tactical
Mk series bombs (inert)	F-15E, F-16, A-10	
ATGM-114 Hellfire Rocket (inert)	AH-1W & UH-1N	Tactical
ATGM-114 Hellfire Rocket HE	AH-1W & UH-1N	Conventional
2.75 inch Rocket (inert)	F-15E, F-16, AH-1W, UH-1N	Tactical
2.75 inch Rocket HE	AH-1W, UH-1N	Conventional

are special types of delayed high explosive that penetrate armored vehicles. The 2.75” rockets are unguided missiles. The 2.75” inerts function the same way as inert Hellfires, while the HE is designed for fragmentation upon impacting the target. Reduced-range practice rockets (RRPR) are unguided missiles that are inert and have a WP spotting charge.

The North Tactical Range is designed for training with bullets and inert ordnance. There are many approved targets for the various-sized bullets and inert ordnances. The targets and attack headings by aircraft are arranged in a manner that all the expended ammunition remains within the perimeter of the range.

The North Conventional Range is designed for training with bullets and HE ordnance. HE ordnance includes artillery and mortar ordnance, HE ordnance from AC-130 gunship cannons, 2.75 HE rockets, and Hellfire rockets. The targets and attack headings by aircraft are arranged in a manner that all fragmentation is encompassed within the black slashed overlay (Figure 2.1.1-2), commonly referred to as the HE area of the North Conventional Range. Artillery and mortars have designated targets and firing points that ensures that all fragmentation stays within the HE area. RRPR inert rockets fired by the HIMARS is the one exception that allows inert ordnance to be fired into the North Conventional Range. Other targets exist in the HE area of the North Conventional Range. These targets are designed for the use of bullets. Again, the targets and aircraft attack headings are configured to keep the expended ammunition within the perimeter of the North Conventional Range.

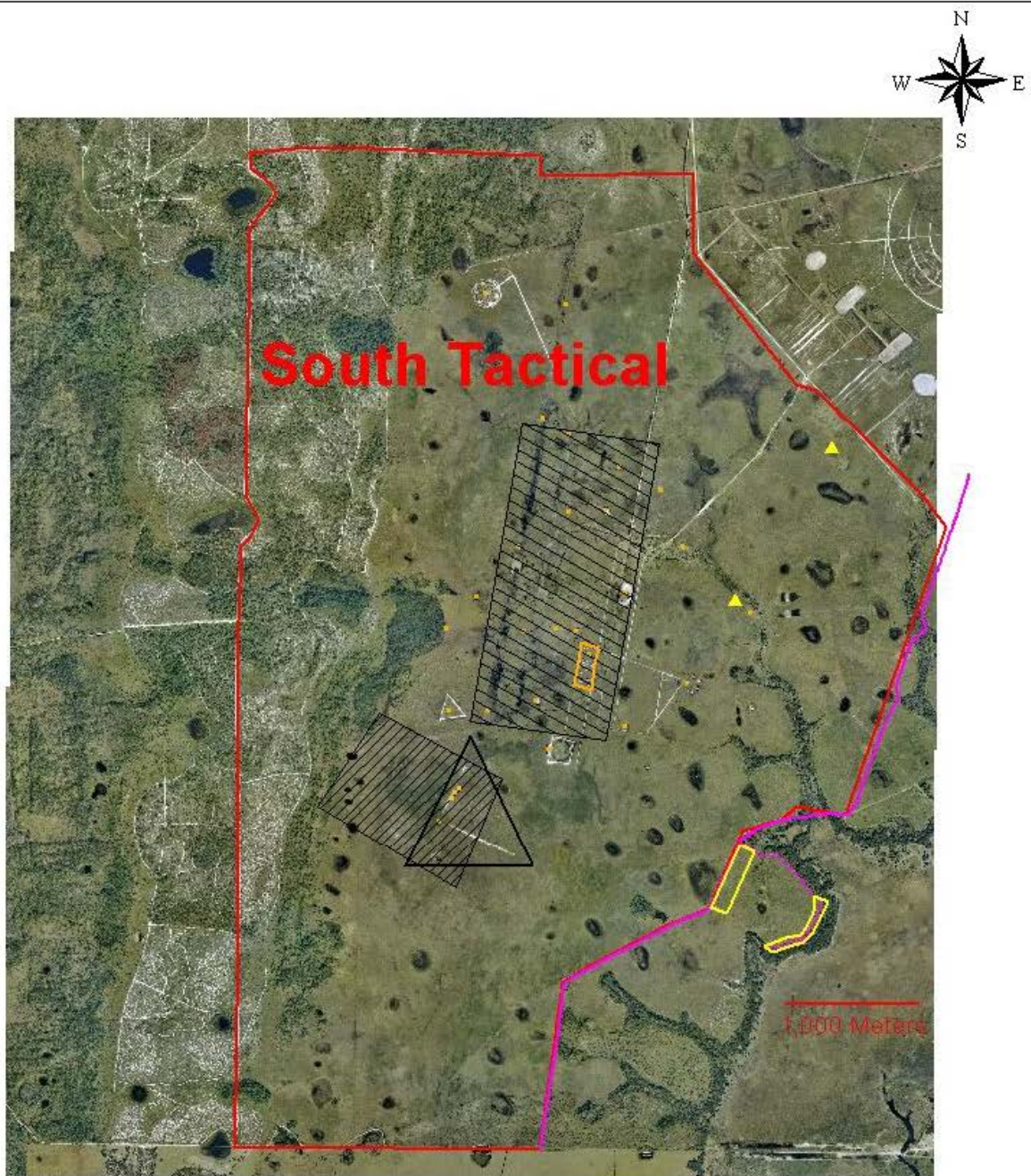
Mid-level Operations:

The Mid-level Operations places the TACPs and FOs on static positions located in the South Tactical Range (Figure 2.1.2-2) to include any of the buildings or area within a mock village. The general scenario is similar to the Advanced Operations with the available assets and prioritizing targets. The Mid-level Operations, however, are less complex and more restrictive in available assets. On 9 May, only single assets are available at any one time. On 10 May, only two types of assets are available at any one time, and, on 11-12 May, only three assets are available at any one time. Aircraft assets with HE are limited to the AC-130 firing a cannon with 40mm HE and a 105mm training round with a 40mm equivalent explosive charge firing at targets located within the triangular HE 40mm surface-danger zone (SDZ). The targets for AC-130 for the JIFE within the 40mm SDZ are limited to the vehicle convoy consisting of buses and small passenger vehicles – a total of nine vehicles in all. All other aircraft, both fixed- and rotary-wing, are available for firing their respective bullets and inert ordnance at remaining inert-only targets located in the South Tactical Range outside of the 40mm SDZ. The 81mm and 120mm mortars fire the three different types of ordnance from the West MFA and East MFA. They target only the first three vehicles going south to north. About halfway through the exercise, these mortars relocate to MP2 and MP3 in the north, while the mortars in MP2 and MP3 relocate to the West MP and East MP. HIMARSs fire from FP14, FP17, and FP18 into a designated area of the South Tactical Range's impact area. The type of ordnance and assets available for the Mid-level Operations for the South Tactical Range are listed in Table 2.1.2-2.

Table 2.1.2-2. Ordnance Delivered by Asset for the Mid-level Operations

ORDNANCE	ASSET
7.62mm ball and tracer	AH-1W and UH-1N
20mm bullet	AH-1W and UH-1
20mm HE	AC-130
40mm HE	AC-130
81mm HE, Illum, WP	Mortars
120mm HE, Illum, WP	Mortars
105mm training round w/40mm HE	AC-130
RRPR	HIMARS
BDU	F-15E, F-16, A-10
Mk series bombs (inert)	F-15E, F-16, A-10

All of the hypothetical opposition targets are existing targets. All of the ordnance except the 81mm, 120mm mortars, and RRPRs have been used and are approved for use on the South Tactical Range.



LEGEND

- Mortar_Firing_Area
- 120mm_SDZ
- RRPR_SDZ
- 40mm_SDZ
- Target
- Diskline
- Tank_Trail
- MOUT
- Impact_Range

Figure 2.1.2-2. Observation Points and Surface Danger Zones in the South Tactical Range.

2.1.3 JIFE Training That Is New to APAFR Under the Proposed Action:

The following portions of the JIFE training that are new to APAFR and consequently assessed in this EA are as follows:

- a. Concurrent Use of Air Assets with Ground Mortar and Artillery Assets: The JIFE coordinates air assets with mortar, howitzer, and HIMARS for the first time at APAFR. This concurrent use is accomplished on all three ranges by TACPs and FOs and is a major focus of the exercise. Mortars, howitzers, and the HIMARS all deliver ordnance below 8,000 feet altitude, while fixed-wing aircraft deliver ordnance above 9,000 feet. Rotary-wing aircraft deliver ordnance and bullets below 8,000 feet as well as fixed-wing aircraft delivering bullets. Both deconflict airspace usage with mortars and artillery by not occupying the airspace at the same time. Airspace usage by air and ground assets is coordinated by TACPs.
- b. TACPs and FOs in the High Explosive Area: The JIFE places TACPs and FOs within the HE area of the North Conventional Range in one location and adjacent to it in another location (Figure 2.1.2-1). The TACPs and FOs direct all listed HE, bullets, and RRPRs going into the HE area for the North Conventional Range as well as inert ordnance and bullets going into the North Tactical Range. This training is further developed by the TACPs and FOs directing fire into both ranges while traveling in SUVs along the convoy route.
- c. Increase in HE Hellfire Missiles: Currently up to 48 HE Hellfire missiles are authorized annually for use on the North Conventional Range at the designated Hellfire missile target (Figure 2.1.2-1.) Firing is from any one of three firing points. The JIFE fires 100 HE Hellfire missiles for the Advanced Operations. No other training is foreseen in 2005 that expends Hellfire missiles; therefore, the proposed action increases the number of Hellfire missiles expended annually to 100.
- d. Firing 155mm Howitzers from the Northern Half of the Karen Drop Zone: The JIFE fires artillery from the Karen DZ for the first time. The two 155mm howitzers fire up to eight HE rounds each during 9 May.
- e. Increase in RRPRs and Use of RRPRs in the South Tactical Range: Currently up to 81 RRPRs are authorized for annual use on the North Conventional and North Tactical Ranges collectively. These RRPRs are expected to be used in 2005 by another unit that is not participating in the JIFE. Therefore, the Proposed Action fires 144 additional RRPRs in the North Conventional and South Tactical Ranges collectively. The nature of the Advanced and Mid-level Operations cannot specify an exact number of RRPRs per range, but no one of the two ranges will exceed 100 of the 144 RRPRs. Also, under the Proposed Action, the South Tactical Range has RRPRs delivered to it for the first time. Targets selected for the RRPRs have been configured so that the rockets will impact the area delineated as the RRPR SDZ in Figure 2.1.2-2. This area is called a surface-danger zone (SDZ). The SDZ delineates the potential location of where the RRPRs will land. The SDZ is 285 acres.

- f. Firing HIMARS from Oscar Range and Firing Points 17, 18, and B-4. One platoon consisting of three rocket-launching vehicles fires rockets from the paved-surface road, strafe run-in lines, and the strafe pad within the Oscar Range to the North Conventional Range. One platoon of rocket-launching vehicles fires rockets from FP 17, 18, and B-4 into the South Tactical Range.
- g. Establish Two New 81mm and 120mm Mortar- Firing Areas for the South Tactical Range: The JIFE establishes a ten-acre area (West MFA) and an eight-acre area (East MFA) that either the four 81mm mortars or four 120mm mortars set up in at any one time (Figure 2.1.2-1). The mortars set up in any location within the two areas. Cargo trucks supply the mortars within the area. The mortar crews establish hasty defenses as part of their bivouac exercise.
- h. Introduction of 81mm and 120mm Ordnance in the High-Explosive Area of the South Tactical Range: The JIFE delivers 81mm and 120mm ordnance against three existing targets in the already established 40mm SDZ. The 40mm SDZ was configured for the AC-130 gunship. The 81mm and 120mm ordnance consists of HE, Illum, and WP. A 120mm SDZ encompasses an area where the mortar ordnance is expected to fall, including the distance that HE fragmentation travels. The total area is 118 acres (Map 2.1.2-2). The 120mm SDZ overlaps portions of the 40mm SDZ and also covers new areas outside of the 40mm SDZ. The new areas covered by the 120 mm SDZ totals 82 acres. Most of this acreage is to the west of the 40mm SDZ. The mortars are fused to explode on impact with the ground. This type of fusing for the 120mm mortars creates a crater two meters in diameter and 15 cm deep (ERDC/CRRE 2003). Smaller craters are expected for the 81mm mortars. Approximately 50 percent of the mortars are expected to land within a 25-meter radius of each target. No more than 500 mortars are fired. To aid in identifying and segregating the location of the three targets for the crews firing mortars, white conex boxes are placed on an existing disk line that is adjacent to the buses. These boxes are about the size of passenger van.
- i. Extending the 155mm Howitzers Beyond the 100 Meter Set-up Radius: Current firing points limit the set-up of artillery to within a 100-meter radius of an established firing point. The 155mm howitzers in this exercise are set up in a line or staggered line 50 meters apart. With six howitzers, this equates to 300-meter line. Therefore, the radius is increased to 300 meters. Field inspections of the firing points indicate that only the northern half of each firing-point radius is usable by the howitzers because trees and brush block the field of fire, so only the 300-meter radius for the northern half of each firing point is assessed. The exception is for FP11 and FP12, which have too much brush in the center to allow the set-up calculations for the howitzers. For these two FPs, the line is 400 meters out from the firing-point center and occupies only the northwest quadrant of the 360-degree radius.

2.2 Alternative A

Alternative A is the same as the Proposed Action with three exceptions. First, the mortars fire only at the AC-130 HE target in the South Tactical Range. Second, the mortars fire only from the West MP location. Third, the two 155mm howitzers are air dropped into the east half of the Joan

DZ (Map 2.1.1-2). The howitzers fire in the same manner as the proposed action. The howitzers depart from the Joan DZ and travel on the tank trails and occupy any of the FPs described in the Proposed Action. The two howitzers accompany the remaining four howitzers.

2.3 Alternative B

Alternative B is the same as the Proposed Action with two exceptions. First, the mortars fire at the AC-130 HE target in the South Tactical Range. Second, the mortars fire only from the East MP location.

2.4 No-Action Alternative

The JIFE exercise is reduced to those aspects of the operations that have been previously assessed by existing NEPA documents at APAFR. The value of the JIFE is greatly diminished to the point of negligible training value because the main emphasis of the exercise, joint integrated fire from air and ground-based assets, is foregone. Air and ground-based ordnance assets fire separately in different operations. Other attributes are limited in terms of asset availability, ordnance used, and location of the TACPs and FOs. The Advanced Operation and Mid-level Operations are described separately.

2.4.1 Advanced Operations:

- a. Ground-delivered ordnance is not conducted jointly with air-delivered ordnance. They are considered and employed as two separate operations.
- b. The TACPs and FOs are not in the North Conventional Range. The TACPs and FOs do not convoy.
- c. The two 155mm howitzers are air-dropped into the Karen DZ or the Joan DZ, but do not conduct live fire: they are dry-fire only.
- d. The platoons of HIMARS do not conduct live fire they are dry-fire only.
- e. Only 48 HE Hellfire missiles are launched at the Hellfire target located in the North Conventional Range.

2.4.2 Mid-level Operations:

- a. Ground-delivered ordnance is not conducted jointly with air-delivered ordnance. They are considered and employed as two separate operations.
- b. The platoon of HIMARS does not occupy Oscar Range but may occupy any previous authorized MLRS dry-fire location. It does not conduct live fire; it is dry-fire only.

- c. The 81mm mortars do not set up in the West FP or East MFP east of the South Tactical Range, nor do they fire into the South Tactical Range.
- d. The 155mm mortars are arranged in a manner that keeps them within the 100-meter radius of each firing point.

3.0 Affected Environment

3.1 Airspace and Aircraft Operations

Airspace management includes the handling, directing, and controlling of flight operations in the air. Approximately 26,000 aircraft operations occurred at APAFR during FY 94 (USAF 1996), and current annual aircraft operations are expected to be similar in number. The airspace region of influence (ROI) encompasses an area within a 30-nautical-mile radius of APAFR from the ground surface up to 18,000 feet mean sea level. This represents a three-dimensional volume of airspace that supports air-to-ground conventional and tactical weapons delivery training, tactical navigation training, advanced air-to-air combat training; and equipment and personnel airdrop training. Management and operation of this airspace is the same for the Proposed Action, the Alternative Actions A and B, and the No-Action Alternative.

3.2 Safety

The safety considerations associated with the Proposed Action include crash fire-and-rescue response, flight risks (aircraft mishaps and emergencies), and ground risks such as ordnance and munitions risks and range-safety issues. In selecting each target site, consideration was given to the footprints of various weapons. None of these footprints were larger or affected more area than those already in place.

3.3 Noise

Noise is defined as any sound that is unwanted. Noise is described by its amplitude, as measured in decibels (dB), and frequency as measured in cycles-per-second or Hertz (Hz). Different types of sounds can be considered bothersome for different reasons. For example, jet aircraft produce noise at a broad range of frequencies (20 Hz – 10,000 Hz) while artillery-fire noise energy is concentrated in the low-frequency range (20 Hz – 1,000 Hz). High-amplitude, low-frequency noise has strong potential to cause items to “rattle” which can be a source of annoyance above and beyond audible sound. Social surveys have confirmed that using the same system for describing these two types of noise does not yield accurate results. The “A-weighting” and “C-weighting” scales have been found to best predict reactions to mid-range (aircraft overflight-type) and low-frequency (artillery-type) noises respectively. These scales mathematically emphasize noise energy within the frequency range for which the particular type of noise has the greatest impact while de-emphasizing noise outside of these frequencies.

Because noise levels rise and fall constantly, metrics (mathematical descriptors of a physical event) that make use of averaging are often used to describe the overall noise level in a given

area. Day-Night Average Sound Level (DNL) adds together all sound energy occurring in the course of a standard busy day and averages it out over the 24-hour period. All noise events occurring after 10:00 p.m. or before 7:00 a.m. are assigned a decibel penalty.

Aircraft overflight noise levels exceeding 65 dB DNL (A-weighted) in a noise-sensitive area are generally considered as warranting further analysis (EPA, 1974). The equivalent threshold of concern for artillery noise is 62 dB DNL (C-weighted). Recent analysis of noise at APAFR indicates that, while aircraft-generated and artillery-generated noise levels may exceed 65 dBA DNL and 62 dBC DNL at locations on APAFR, these noise-level thresholds are not expected to be exceeded at any location outside of the installation's boundary (Wyle Labs, 2004).

In cases where a Proposed Action involves a relatively low overall number of noise events, such as is the case with the proposed JIFE training, single-event noise metrics are often the best indicator of noise impacts. For this analysis the metric "decibels at peak blast" is used. This metric simply records peak noise level reached during the firing of a single artillery round. Artillery noise guidelines developed by the Naval Surface Warfare Center, Dahlgren, indicate that levels below 115 dBP are unlikely to elicit complaints from local residents (Dr. William Russell, personal communication).

Peak noise levels between 115 and 120 dBP are likely to elicit complaints but are unlikely to cause damage to structures.

3.4 Hazardous Materials and Waste

APAFR is a small-quantity generator under the Resource Conservation and Recover Act (RCRA) program. Small quantities of paints and lubricants are generated on a yearly basis from vehicle-maintenance and facilities-maintenance operations. Antifreeze, used oils, fuels, batteries, and fluorescent lighting are generated and shipped off-site for recycling or energy recovery. All hazardous material brought on the property is approved and the usage is tracked. Insignificant quantities of hazardous materials are used, and therefore no reporting requirements exist. APAFR reports the storage and usage of gasoline and diesel fuels under the Emergency Planning and Community Right to Know Act. A contractor maintains an aviation gasoline fuel tank on-site and reports this material under Sections 311 and 312 of the Emergency Planning and Community Right to Know Act.

3.5 Environmental Restoration

There are three sites in the southern target area and there are three sites in the northern target area. They are all classified as munitions burial sites in the Environmental Restoration Program (ERP). The munitions in the landfills are considered solid waste as they have all been previously demilitarized (rendered safe). Site investigations indicate no migration of chemicals harmful to the environment.

3.6 Air Quality

APAFR is located in an attainment air-quality zone. The northern target area is in Polk County and the southern target area is in Highlands County. Military air and ground tactical vehicles are exempted from air emission tracking under the Clean Air Act. Emissions from ordnance are tracked by the Toxic Release Inventory Data Delivery System (TRI-DDS) (URS 2001). Emission releases by ordnance at APAFR are classified as 'Otherwise Use' 'Non-Air Releases'. Values reported for CY2003 are 13,885 pounds of Copper and 5,563 pounds of Lead.

3.7 Geology and Soils

The earth resources that are potentially impacted by the Proposed Action include surficial geologic resources and soils.

Both of the north ranges are located on the Bombing Range Ridge whereas the South Tactical Range occurs on the Bombing Range Ridge and the flat, nearly level Osceola Plain. The Bombing Range Ridge is a remnant of a marine sand bar that rises from 40 to 66 ft (12 to 20 m) above the base level of the surrounding Osceola Plain. It is a major topographic feature of the Osceola Plain and is located from four to seven miles (6 to 12 km) east of the Lake Wales Ridge and is separated from it by Arbuckle Creek. The Bombing Range Ridge is oriented in a north-south direction and is located primarily within APAFR.

Surficial geology of APAFR consists of undifferentiated deposits of unconsolidated coastal sand, shell, silts, sand, and gravelly sand of Plio-Pleistocene age. These deposits range from 50 ft to 150 ft (15 to 45 m) in thickness; with the deepest being on the Bombing Range Ridge. Surficial deposits are underlain by the Peace River Formation and the Hawthorne Group. The Peace River Formation consists of interbedded sands, clays, and dolomite with variable phosphate content. The Hawthorne Group, a member of the Arcadia Formation, consists of quartz, sandy, phosphatic, and sometimes clayey dolomites and occasionally limestones. Below the Hawthorne Group lie the Ocala Group and Avon Park Limestone Formation. The Ocala Group contains two upper formations, both of which are undulated and consist of a coquina of large foraminifera in a chalky calcilutite matrix and a lower formation that is a well-undulated limestone and dolomite. In southeast Polk County, the top of the Ocala Group is approximately 100 ft (30.3 m) below mean sea level and generally about 300 ft (91m) thick. The Avon Park Limestone Formation lies below the Ocala Group and consists of finely crystalline dolomite with some fossiliferous limestone. It is a generally highly fractured, very permeable, and up to 700 ft (212 m) thick..

Soils are discussed below.

North Ranges

The majority of mapped soil series are spodosols. Spodosols are sandy soils distinguished by a "spodic horizon," that is, "a subsurface zone in which organic matter in combination with aluminum and/or iron has accumulated due to downward leaching." Myakka fine sand (Aeric Haplaquods) is the predominant soil series. It is a poorly drained, acidic upland spodic soil, which can be wet for extended periods in most years. The St. Johns-Basinger-Placid soil

association mapping unit occurs in the northwest portion of the area.

South Tactical Range (Echo)

Within the RRPR SDZ portion (562 acres) of Echo Range, the soils with the greatest coverage are (approximately 340 acres) of Basinger sand (Spodic Psammaquents), or Placid sand (Typic Humaquepts) on approximately 11 acres. Muck soils (Samsula, Sanibel, and St. Johns-Basinger-Placid) cover approximately ten acres.

Within the 120mm surface danger zone (144 acres), the majority of soils are Immokalee sand (Arenic Haplaquods). Most of the remaining soils are mucks of either Basinger, Hontoon, Sanibel, or St. Johns-Basinger-Placid.

Oldsmar sand (Alfic Arenic Haplaquods) covers almost all of West MFA.

Oldsmar and Felda soils cover most of the ten-acre East MFA.

3.8 Water Resources

Aquifers: There are three fresh-water aquifers at APAFR. The deepest is the upper Floridan aquifer. The upper Floridan aquifer is 50 feet to 400 feet deep with a thickness of 900 feet to 1,200 feet (Barr 1992). Water recharge for this aquifer is from large sinkhole lakes that have breached confining clay layers above the upper Floridan aquifer. The upper Floridan aquifer meets the Florida Department of Environmental Protection (FDEP) drinking water standards and is the source of drinking water at APAFR. Above the upper Floridan aquifer is the intermediate aquifer. The intermediate aquifer is separated from upper Floridan by a confining clay layer. The intermediate aquifer is approximately 200-feet thick at APAFR. Water recharge is from sinkholes that have breached the confining clay layers above the intermediate aquifer. Water quality is acceptable for drinking water. Above the intermediate aquifer is the surficial aquifer. The surficial aquifer is separated from the intermediate aquifer by a clay confining layer. The surficial aquifer is 50- to 200-feet thick. The surficial aquifer is recharged by the water table above it.

Water Table: The water table is part of the surficial aquifer. The depth of the water table varies from continuously above the ground surface found in permanent swamps and marshes to five feet or more below the surface (USDA 1990). Ground-water sampling at APAFR finds water quality below safe drinking-water standards due to exceeding standards for aluminum, iron, and thallium (Earth Tech 2000, 2002). Some ground water sampling sites are located within impact ranges and are monitored for explosive compounds. No explosive compounds have been found in the samples. Also, the samples for metals associated with ordnance have been tested as well with results showing that most of the levels of metals are within the background concentrations for APAFR (Hayford 2004).

Surface Water: The direction of surface-water flow at APAFR is directed by the Bombing Range Ridge. Bombing Range Ridge runs north to south down the center of APAFR. The North Conventional Range and the western half of the North Tactical Range are east of the ridge with surface water flowing into Morgan Hole Creek. The South Tactical Range is east of Bombing

Range Ridge with surface-water flowing into several short sloughs that empty into the Kissimmee River. Surface water samples taken in 2004 for Morgan Hole Creek and two sloughs flowing off the South Tactical Range determined explosive residue, perchlorate, lead, and manganese below levels for the Florida Surface Water Quality Standards (Weston 2004). These were the only constituents tested for.

Wetlands: Many of the existing targets and associated disked target enhancements (simulated runways and roads) occupy wetlands. These targets and enhancements are permitted under a Section 404 permit (USACE 2000).

The Morgan Hole Creek riparian within the North Conventional Range is a functioning riparian with a stable channel and active floodplain.

The existing artillery firing points and mortar points are located outside of wetlands or, if partly in wetlands, are signed to prevent firing units from setting up in wetlands. Expanding the firing points to a 300-meter radius encompasses new wetlands that are not signed. This includes FPs 9, 11, 12, 14, and 19-24. These wetlands were assessed for condition using *Range Sites of Florida* (Mullahey et.al. 2002). FP9 entails a marsh to the south of it. It is in good condition. FPs 11 and 12 are cutthroat grass seeps. The seeps have a slash pine overstory and are fairly open, but the majority of the seeps are occupied with pine plantations with a less-open overstory. FPs 19, 20, 23, and 24 are near Morgan Hole Creek. The creek is distinctive with oak hammocks adjacent to it. The riparian condition is in poor condition with few riparian plants due to an entrenched creek and a thick overstory of oaks. FPs 21 and 22 have marshes to the south that are in good condition.

Oscar Range also encompasses some wetlands. Where the HIMARS travel on the Oscar Range, only a portion of the strafe run-in lines go through marsh wetlands. These wetlands are disturbed and in poor condition. The proposed HE area for the mortars in the South Tactical Range also contains wetlands - approximately 61%. These wetlands are sloughs, marshes, and flatwoods. Being just off Bombing Range Ridge, the sloughs and marshes have an influence of a wetland seepage slope with the associated cutthroat grass. Normally the flatwoods would not be considered a wetland, but, because of the seepage slope, there are some wetland species, namely cutthroat grass, and soil conditions that make it a wetland. These wetlands are in excellent condition when not part of target enhancement areas that are disked. The wetlands in disked areas are in poor condition. The HE targets for the mortars and AC-130 are in uplands.

The SDZ for the RRPRs is 86% wetlands. It is similar in wetland composition to the new HE area for mortars. Wetlands consist of sloughs, marshes, and flatwoods with seepage slope influences from the Bombing Range Ridge. This area is far more disturbed with more targets and target enhancing features. The wetland condition ranges from poor where wetlands are continuously disked to good condition where disturbance has not occurred.

3.9 Vegetation

North Ranges

Although Hairy jointweed occurs within the north range complex, no populations occur within any portions of the Proposed Action and Alternatives A and B. Some unsurveyed, potential locations for federally listed plants occupy FPs 8-10. State-listed plants are known to occur. Most of the upland vegetation (ca 150 acres of the 403 acres) surrounding the convoy route in the North Tactical Range has previously been altered, having been formerly cleared and allowed to re-vegetate following frequent ground disturbance (i.e, disking, moving targets, etc.). There are also several blocks (approximately 154 acres) of intact, frequently burned pine flatwoods/savanna vegetation primarily located along the eastern portion of the site. The vegetation within these blocks is of high biodiversity being primarily the result of very frequent mission and prescribed fires. Within these blocks, there is a population of wild coco orchid (*Pteroglossaspis ecristata*=*Eulophia ecristata*) a state-threatened plant. This population consists of at least three sub-populations that have fluctuated from 13 plants in 2001, 27 in 2002, 92 in 2003, and 15 in 2004. Wild coco orchid is currently under consideration for potential listing as a federally protected plant.

Approximately 100 acres within the boundaries of the convoy route consists of cutthroatgrass (*Panicum abscissum*)-dominated communities (cutthroat wet lawns, cutthroat flatwoods, and cutthroat margin depression marshes). Located in the northwest corner of the site is a cutthroat-dominated community that remains wet nearly year round with seepage from the surrounding uplands. Cutthroatgrass is a state-listed plant.

South Tactical Range (Echo)

Vegetation within the RRPR surface-danger-zone portion (562 acres) of Echo Range is Florida dry prairie that covers approximately 351 acres of the site. Within the 120mm surface-danger-zone, the vegetation is Florida dry prairie that covers approximately 143 acres of the site. Most of the remaining vegetation is wetland.

Within the West MFA, 95% is Florida dry prairie vegetation. Most of this is classified as dry-mesic prairie and contains ten permanent vegetation monitoring plots located along transect #50. Transect #50 has been sampled several times since it was established in 1997 as part of a long-term ecological monitoring project to characterize Florida dry prairie. Data from this transect has been used to characterize Florida grasshopper sparrow occupied and unoccupied habitat, and for vegetation monitoring associated with implementation of the Integrated Natural Resources Management Plan (INRMP 2004).

At East MFA, 81% is Florida dry prairie along the edge of a fringing mesic oak hammock.

3.9.1 Federally Listed Plant Species at APAFR

Central Florida and APAFR are home to many plants that have been designated as threatened or endangered by the federal government or State of Florida. At APAFR, there are two federally-listed and 50 state-listed plants. Federally threatened and endangered plants are protected under

the Endangered Species Act (ESA) of 1973 (16 U.S.C. §§ 1531-1544, as amended). The listings of these species are maintained and periodically updated by the USFWS (Title 50 CFR §17.12).

One federally-listed threatened plant (pigeonwing) and one federally listed endangered plant (hairy jointweed or wireweed) are known to occur on APAFR. Surveys have been and continue to be conducted to document their occurrence. Following are descriptions of these two plants.

3.9.1.1 Pigeonwing (*Clitoria fragrans*)

Pigeonwing is a federally listed threatened plant. It is identifiable by its erect habit as a perennial herb in the pea family. The inverted pale purple flowers of this plant give it its common name. It is well known to inhabit the vegetative communities that occur along the Lake Wales Ridge in Highlands, Polk, and Orange Counties. The Orzell report (1997) notes that pigeonwing is found in habitats intermediate between sandhill and scrub areas, and in turkey oak sandhills. Where plants have been located, they are never in groups of large numbers. Fire management is probably vital to the long-term survival of the species. Field monitoring for this species at APAFR occurs from April until a killing frost occurs. Pigeonwing is known to occur at various locations at APAFR (Figure 3.10.1.2-1). Fifty-seven (57) sites have been identified as potential habitat for this species at APAFR (Orzell 2004). As of August 2004, 89% of the total sites had been surveyed.

APAFR natural resources personnel conduct long-term rare-plant monitoring and intensive field surveys for additional rare plant populations. A long-term population and demographic study of pigeonwing is currently conducted at APAFR, with more than 1,600 plants that are the subject of intensive monitoring of growth, flowering, and fruiting. Field activities for pigeonwing are conducted on a bi-weekly basis, from April until a killing frost, with peak flowering conditions occurring in April and May.

3.9.1.2 Hairy Jointweed (*Polygonella basiramia*)

Hairy jointweed is a federally listed endangered plant. It is annual, short-lived herb that can disperse to bare sandy soils created by disturbances (Orzell 1997). Field monitoring for this species is conducted at APAFR from October to January. The species is only known to occur in Polk and Highlands Counties in Central Florida, endemic to the ridges of the area: Lake Wales, Winter Haven, and Bombing Range. Most commonly, hairy jointweed is found in rosemary scrub. Although there are no areas specifically referred to as “rosemary scrub” on APAFR (Orzell 2004), there is scrub habitat that supports hairy jointweed. For maintenance of its habitat, hairy jointweed requires periodic disturbance by fire.

Approximately 150 sites have been identified at APAFR as potential habitat for this species. As of August 2004, 39% of the total number of sites had been surveyed. Figure 3.10.1.2-1 shows the known locations of hairy jointweed at APAFR. APAFR natural resources personnel conduct long-term rare-plant monitoring and intensive field surveys for additional rare-plant populations each year. Field activities for hairy jointweed are conducted on a biweekly basis, from October to early January, with peak flowering conditions occurring in October and November. Areas of rare plant species are primarily managed by putting prescribed fire into the habitat.

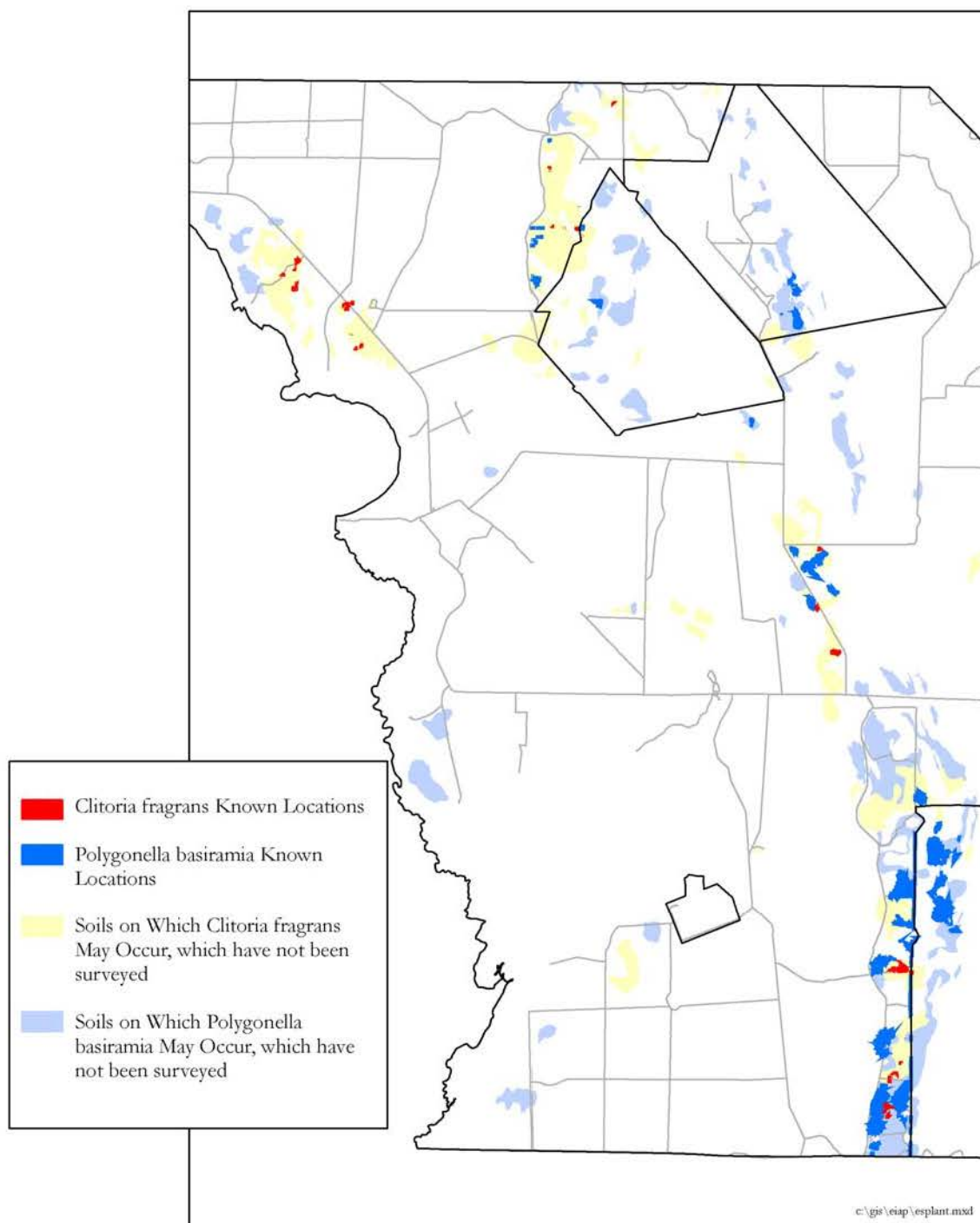


Figure 3.10.1.2-1. The Locations of *Clitoria fragrans* and *Polygonella basiramia* at Avon Park Air Force Range, Florida.

3.10 Fish and Wildlife

3.10.2 Federally Listed Wildlife Species at APAFR

Table 3.10.2-1

Common Name	Scientific Name	Federal Status
Florida grasshopper sparrow	<i>Ammodramus savannarum floridanus</i>	E
Red-cockaded woodpecker	<i>Picoides borealis</i>	E
Wood stork	<i>Mycteria Americana</i>	E
Florida panther	<i>Puma concolor coryi</i>	E
Florida scrub jay	<i>Aphelocoma coerulescens</i>	T
Audubon's crested caracara	<i>Polyborus plancus audubonii</i>	T
Bald eagle	<i>Haliaeetus leucocephalus</i>	T
Eastern indigo snake	<i>Drymarchon corais couperi</i>	T

3.10.2.1 Florida Grasshopper Sparrow

The Florida grasshopper sparrow (*Ammodramus savannarum floridanus*) (FGS) is listed as endangered. The FGS is known to occur in southern Osceola, southern Polk, northern Highlands, western Okeechobee, and western Glades Counties. Historically, the FGS was reported from the same general area, but from a somewhat larger range. The FGS rangewide population decline has been attributed to loss of habitat. Walsh found at the Three Lakes Wildlife Management Area that FGS population density changed within the site as habitat quality changed due to the length of time post-burn. Also, FGSs strongly preferred areas burned within one year and avoided areas unburned for more than two years. FGSs did not colonize areas of apparently suitable habitat that were separated from the population by areas of unsuitable habitat (Walsh and Darrow 1995). In 2000, it was stated that approximately one-quarter of all FGSs known to exist occurred at APAFR (USAF 2000). The most recent estimates of the regional overall FGS population indicated that there were fewer than 800 individuals as of the 1997 breeding season; at that time, they reported approximately 200 birds at APAFR, 150 to 200 at Three Lakes Wildlife Management Area (Osceola County), and at least 200 on the Kissimmee Prairie State Preserve, Okeechobee County.

Historically, APAFR has had three separate populations of FGS. The FGS populations have been monitored at APAFR for many years. Table 3.10.2.-2. Shows populations estimates for the FGS for the three populations from 1996 to 2004.

Table 3.10.2-2 Florida Grasshopper Sparrow Populations

Impact Area	1996	1997	1998	1999	2000	2001	2002	2003	2004
Bravo/Foxtrot	*	43	28	27	11	8	7	0	0
Charlie/Echo	102	142	115	137	81	92	92	12	7
Delta/OQ	69	113	90	80	73	52	45	5	0
Total	171	298	233	244	165	152	144	17	7

* No surveys

The FGS population point counts at APAFR have declined significantly since 1997. In 2004, only seven sparrows (six singing males and one bird of unidentified gender) were detected during

point counts (Tucker 2004); all seven were located within the Echo Range. An additional nine singing males were detected outside of the point counts; all birds were found either in the Echo Range (4), Bravo Range (1), or OQ Range (4) suggesting that the point count indices may underestimate the total FGS population at APAFR.

Although many FGS studies have been reviewed and many interagency meetings have discussed this decline, no specific cause for the decline has been identified at APAFR. APAFR continues to monitor and manage the FGS in accordance with our cooperative-approved (APAFR, USFWS, FFWCC) endangered-species management plan (ESMP) (*Plan for the Management of the Florida Grasshopper Sparrow, Florida Scrub-jay and Red-cockaded Woodpecker at Avon Park Air Force Range USAF 2001a*). Archbold Biological Station (ABS), an environmental contractor who monitors the FGS, made recommendations that APAFR should restore dry prairie habitat by: removing planted pine plantations, removing cattle grazing, removing predator perches, and conducting prescribed burns during the lightning season (Tucker and Bowman 2005).

The Florida grasshopper sparrow is a subspecies of grasshopper sparrow that is endemic to the dry prairie of central southern Florida. Because of declines in the sparrow's suitable habitat and population size, the National Audubon Society placed the Florida grasshopper sparrow on its blue list in 1974. FGS habitat consists of large treeless, relatively poorly drained grasslands that have a history of frequent fires. A minimum viable population of 50 breeding pairs may require 240-1,348 ha of treeless prairie (Delany et al. 1995). In response to a meeting between the Field Supervisor of the FWS Field Office in Vero Beach, Florida, and the Commander at APAFR, a group composed of APAFR, FWS, FFWCC, and ABS was established to assess habitat available to the FGS at APAFR and address the recommendations submitted by ABS. In accord with the group's goal of conducting dry-prairie restoration activities prior to the 2005 FGS breeding season, APAFR is currently conducting substantial clearing of scrub, shrub, pine, and oak re-growth in historical dry prairie. The South Florida Multi-Species Recovery Plan for the FGS states that alteration and habitat loss are primary threats to prairie species. This initial restoration work is Phase I of a larger restoration activity developed by the group. This restoration activity is two-phased project:

- The first phase will restore the FGS's core habitat by removing scattered hardwoods (oaks) and pine regeneration overstory vegetation. This phase is currently underway, prior to the 2005 breeding season. This action has been identified as Priority 1.
- The second phase will restore sparrow habitat that has been eliminated by encroachment. Hardwoods, pine plantations, and natural pine recruitment will be removed to increase the open area for FGS habitat. This action will increase the FGS's core habitat. This action has been identified as a priority to be accomplished in consecutive years.

3.10.2.2 Red-Cockaded Woodpecker

The Red-cockaded woodpecker (RCW) is listed as endangered. In 2004, APAFR's monitoring activities recorded 24 active RCW clusters. This is an increase of two clusters over 2003.

However, the RCW population has been relatively stable over the past 25 years. One hundred percent of the RCW populations at APAFR are leg-banded. Clusters are dispersed over the entire range with concentrated areas in the north-central/northwest, northeastern, and eastern parts of the installation. The RCW population is managed in accordance with the APAFR ESMP. Also, APAFR RCW-management strategy is consistent with USFWS's RCW Recovery Plan. Likewise, APAFR's Wildlife Biologist consults closely with FWS's RCW Coordinator, Mr. Ralph Costa, when management issues arise.

Management practices in the RCW Habitat Management Units include: prescribed burning, mechanized vegetation treatments (logging, mowing), and planting of longleaf pine. Prescribed burning is the main tool in managing RCW habitat.

Due to the age of trees on APAFR (<85 years normally), RCW habitat is limited. Cavity augmentation is used to supplement natural cavities. Cavity augmentation is conducted in accordance with the USFWS's Recovery Plan. In 2004, APAFR planned to install five to eight cavity boxes. However, Hurricane Jeanne resulted in extensive damage to RCW clusters. Four RCWs were found dead, and fourteen active cavity trees were lost due to strong hurricane winds: the trees either snapped at cavity level or were uprooted. After consultation with Mr. Ralph Costa, USFWS RCW Coordinator, 28 artificial cavities were installed.

Also, RCW translocation has been conducted at APAFR since 1998 in accordance with the Sikes Act Improvement Amendments, specifically 16 U.S.C. Sec 670a(b)(2)(I), "no net loss in the capability of military installation lands to support the military mission of the installation." Twenty-three RCWs (14 females and 9 males) have been translocated to APAFR since 1998. Seventeen of these birds have remained in the population for at least one breeding season. This is a retention rate of 74%, which is high relative to other translocation programs. In 2003, the retention rate was 100%. Translocation is an important tool in facilitating population growth and expansion of the cluster aggregates at APAFR. Translocation is planned for 2005.

3.10.2.3 Wood Stork

The Wood stork is listed as endangered. Wood storks are abundant at APAFR. A systematic population study has not been conducted at APAFR for the Wood stork. However, the University of Florida conducted a "wading bird" survey that included the Wood stork. Wood stork nesting has not been documented at APAFR. APAFR does not conduct specific management activities for the Wood stork.

3.10.2.4 Florida Panther

The Florida panther is listed as endangered. Currently, the only known viable population is in southern Florida. The documented panther populations (DPP), a term used by FFWCC panther biologists, between 2002 and 2003 was 87 panthers. Eighty-four of these 87 panthers occurred south of Lake Okeechobee: (McBride 2003) about 100 miles south of APAFR.

Between 1981 and 2003, a radio-collared panther was recorded on APAFR (FFWCC 2004). The panther was recorded in the northeast corner of the installation four different times in May of

1998. The same panther was recorded approximately 20 times in 1998, 1999, and 2000, generally in the same area. However, the panther has not recorded since June 2000. More recently in 2002, a two-day survey by FFWCC located neither panthers nor panther signs. APAFR has not conducted nor does APAFR plan to conduct a systematic population survey.

3.10.2.5 Florida Scrub Jay

The Florida scrub jay is listed as threatened. At APAFR we have four populations: North Bombing Range Ridge, South Bombing Range Ridge, Kissimmee River, and a scattered population characterized as “isolated.” The FSJ population at APAFR fluctuates from year to year. In 2004, APAFR had 56 groups. One hundred percent of the known Florida scrub jay population at APAFR is leg-banded.

Designated areas, known as Habitat Management Units, are managed for FSJ breeding habitat; relatively open areas that facilitate movements such as dispersing. Prescribed fire and mowing are the primary ways APAFR manages FSJ habitat.

Population status and trends are determined by an annual census, normally in late June and early July. All chicks are leg-banded in the nest during nest checks immediately after hatching.

3.10.2.6 Audubon’s Crested Caracara

The crested caracara is federally listed as threatened. Habitat for the crested caracara is the dry prairie, wet prairie, and the marsh ecosystem. Much of this type of habitat is located on APAFR. Likewise, caracaras are occasionally sighted at APAFR. However, nesting has not been documented at APAFR.

3.10.2.7 Bald Eagle

The bald eagle is federally threatened. The range of the bird includes all the lower 48 states and Alaska. The eagle is common in some areas and was proposed for delisting by US Fish and Wildlife Service in 1999. Eagles are frequently seen at APAFR during the nesting season. The eagle begins nesting in September and ends in May. In 2003, APAFR fledged three eaglets. Two eaglets fledged from the east side (Kissimmee River) nest, and one fledged from the west side of the installation (Frostproof).

3.10.2.8 Eastern Indigo Snake

The Eastern indigo snake is federally listed as threatened. The snake is found throughout Florida and coastal plain of Georgia. The indigo snake occurs throughout the APAFR in a variety of habitat types such as oak scrub, dry prairie, sand pine scrub, pine plantations, pine flatwoods, and hardwood swamps. Studies have shown that the indigo snake has a large home-range area. The primary average home-range size for males at APAFR was 185 ha and for females 100 ha (Legare, M. and D. Breininger, 2002). Information on indigo snake locations comes from casual sightings.

3.11 Grazing Management

With the exception of the establishment of two new MFAs off of Echo Range, all of these new activities take place within the confines of the North and South Range Complexes. Within these ranges, the actual land impacted by these activities is not leased for cattle grazing.

3.12 Invasive Plant Management

There are no invasive species within the confines of this proposed activity that will be impacted by this activity.

3.13 Timber Management

Aside from very limited acreage of pine plantations within expanded FPs 11 and 12 from the expanded firing points, there are no forest resources involved with the Proposed Action, Alternative Actions A and B, and the No-Action Alternative.

3.14 Recreation

With one exception, the proposed activities do not involve areas specifically designated as being used for recreation. The West MFA is approximately 0.1 miles from a segment of the Florida National Scenic Trail. The trail is not in the South Tactical Range. The trail is managed under an agreement with the Florida Trail Association.

3.15 Military Training

3.15.1 Resource Definition

The mission of APAFR is to provide a training infrastructure that allows U.S. air and ground forces to practice the latest combat training techniques and procedures safely, efficiently, and realistically, and to design training facilities that meet each using unit's needs. The range is used for air-to-air combat and air-to-ground bombing and gunnery training by DoD aircrews, as well as other DoD military units for a variety of training activities. These activities include artillery firing, search and rescue operations, joint service exercises, and other ground training exercises (USAF 1996).

3.15.2 Existing Conditions

APAFR has four active air-to-ground impact areas. These areas include two scorable tactical, air-to-ground ordnance impact areas - South Tactical (Echo) and North Tactical (Foxtrot) - and two scorable conventional, air-to-ground ordnance impact areas - South Conventional (Charlie) and North Conventional (Bravo). Within these impact areas, approximately 90 targets, such as simulated airfields, mock villages, military vehicles, aircraft, missiles, and convoys, are available for air-to-ground and ground-to-ground training primarily using inert/practice bombs and gunnery. APAFR builds and maintains these targets (USAF 1996). In addition, to the four active impact areas discussed above, four other impact areas have been or are currently being used for

training exercises: Alpha, OQ, Delta, and Oscar Ranges. The Alpha Range, which officially opened in 1942, was deactivated in the late 1970s and has not been used since that time. The OQ Range is used as a “para-drop” training area where personnel or cargo are delivered to the area by a parachute from an aircraft in flight (USAF 1996). The Delta Range is located on the eastern portion of Charlie Range and is currently used for tactical air-to-ground training. Special operations use the buildings and structures on Oscar Range for training. All other lands within APAFR are reserved for future military training; however, permitted activities (hunting, grazing, forestry, and recreation) may occur if training operations allow.

3.16 CULTURAL RESOURCES

3.16.1 Definition of the Resource

Cultural resources comprise prehistoric or historic sites, districts, buildings, structures, objects, and other evidence of human activity. These include: archaeological resources, historic architectural and engineering resources, and traditional cultural properties. Archaeological resources are locations where human activity has altered the earth or left deposits of physical remains (e.g., stone tools, bottles, structure ruins). Historic architectural and engineering resources include standing buildings, dams, canals, bridges, and roads. Buildings generally must be 50 years or older, although military structures from the Cold War era (1946 to 1989) can be considered significant if they are of exceptional importance to the Cold War military mission. Traditional cultural properties are associated with the practices and beliefs of a living community. Significant cultural resources are those that are eligible or potentially eligible for inclusion in the National Register of Historic Places (NRHP) or that are important to traditional groups as outlined in the *American Indian Religious Freedom Act* (AIRFA), the *Native American Graves Protection and Repatriation Act* (NAGPRA), and Executive Order 13007. Cultural resources that are unevaluated for NRHP-eligibility are treated as potentially eligible until evaluation is complete.

The U.S. Air Force is required to comply with Section 106 of the *National Historic Preservation Act* (NHPA), including SHPO and American Indian consultation, during the environmental analysis (EA) process. In 1999, the DoD promulgated its American Indian and Alaska Native Policy that emphasizes the importance of respecting and consulting with tribal governments on a government-to-government basis. The policy requires an assessment, through consultation, of the effect of proposed DoD actions that may have the potential to significantly affect protected tribal resources, tribal rights, and Indian lands before decisions are made by the armed services.

3.16.2 Existing Conditions

Historical Setting

Human occupation of the region began at least 12,000 years ago. Over the millennia, complex forms of political and religious community organization developed, accompanied by burial mounds and elaborate earthworks. During the sixteenth century, the Kissimmee and Lake Okeechobee regions are thought to have been under the control of the Calusa people (USAF

2003). The Spanish arrived in the region in the early 1500s and, for the next two centuries, Spain used Florida as a military base to protect their interests to the south (USAF 2003). By 1715, groups of Creek Indians began to move into Florida (USAF 2003). There they were joined by other people, including freed African Americans and escaped slaves, and eventually became known as Seminoles. Historical accounts place Seminoles in the Avon Park area in the mid to late nineteenth century (USAF 2003). The Seminole, Miccosukee, and Muscogee remain in Florida today (Seminole, 2003; Miccosukee, 2002; and Muscogee, 2003) and may have ancestral ties to the Avon Park area. Just north of the Florida-Alabama border in Alabama are the Poarch Creek Indians, also originally part of confederation of tribes known as the Creek Nation (Poarch, no date). In the 1700s, a sizeable British population split the territory into East and West Florida and established the head-rights land grant system and the plantation system of commercial agriculture. Britain returned Florida to Spain after the American Revolution. Florida became a U.S. territory in 1821 and was admitted to the union as a slave state in 1845 (USAF 2003). The area was homesteaded by Euroamericans beginning in the 1840s. After the Civil War, settlement and population increased. Agriculture continued as the dominant industry, with the addition of the phosphate, forest, and fisheries industries (USAF 2003).

World War I brought military training camps and flying schools to Florida and stimulated shipbuilding, agriculture, and turpentine operations. Increased defense spending for World War II expanded industry and agriculture further. Avon Park Army Air Field was built from 1942 to 1945 and served as a World War II Air Corps training facility (USAF 2003). During the mid-1940s, the facility was assigned to the Third Air Force. At the end of World War II, the base was deactivated and assigned to MacDill AFB. The range was reactivated in mid-1946 for demolition practice bombing missions (USAF 2003). In 1950, the base was again deactivated and 25,000 acres were leased for cattle grazing. During the early 1950s, the base was used primarily as a civilian fishing camp and an occasional bivouac site by various military units. In 1951, the U.S. Bureau of Prisons opened a minimum-security prison camp on base (USAF 2003). In 1956, the site was renamed Avon Park Air Force Range.

By 1971, APAFR's mission had expanded to training in the use of F-4 and B-57 aircraft. FLARNG, ROTC, Army, Navy, and Marine Corps also used the range (USAF 1997b). FLARNG became a full-time tenant in August 1984 (USAF 1997b). By 1985, there were six active target complexes: Bravo, Charlie, and Oscar (conventional) and Delta, Echo, and Foxtrot (tactical). In the 1990s, Bravo, Charlie, Echo, and Foxtrot impact areas were all prepared for Hellfire missile firing by the FLARNG. FLARNG units fired 10-mm, 155-mm, and 8-inch guns. In 1996, control over APAFR was transferred to Moody AFB, Georgia, and APAFR became Operating Location Alpha (OL A), Detachment 1 of the 347th Wing at Moody AFB (USF 1997b). As of October 2003, responsibility for APAFR transferred to the 20th Fighter Wing at Shaw AFB, South Carolina, and APAFR became a geographically separated unit of the 18th Air Support Operations Group of Pope AFB, North Carolina. APAFR is now designated as OL A, Detachment 1 of the 18th Air Support Operations Group

Identified Cultural Resources

As of 2003, more than 139 cultural resources consisting of prehistoric, historic, and multicomponent sites had been recorded on APAFR. Of these sites, 37 were determined to be eligible or potentially eligible for the NRHP. In 2004, 12 new sites were identified (Thackston 2004). Two of these are considered eligible for the NRHP. Currently, no resources on APAFR are listed in the NRHP (NRIS 2005), although ten sites are in the process of being nominated (Thackston 2004). In March 2005, Geo-Marine, Inc. conducted a Phase I Cultural Resources Assessment Survey of the Karen and Joan Drop Zones: no cultural materials were identified. This survey completed a minimum of at least a Phase I Cultural Resources Assessment Survey all land involved in the JIFE.

There are no known traditional cultural properties on APAFR associated with American Indian traditions or beliefs (USAF 2003). One Euro American traditional cultural property, Fort Kissimmee Cemetery, is associated with the earliest Euro American settlers of the region. Members of the Fort Kissimmee Cemetery Association retain ownership of the parcel of land containing the cemetery, as well as a small piece of property that extends to the Kissimmee River. The Association maintains the cemetery and continues to inter their dead at that location (USAF 2003).

3.17 Socio-economic Resources

APAFR occupies Highlands and Polk counties. The two counties comprise 3.6% of the state's population. Highlands County has a higher-than-state-average population of people 65 years old or older, 33% compared to the state average of 17% (USCB 2000). The unemployment rate for each county is about 6%. The income levels for both counties are below the state average, below by 18% for Polk County, 30% for Highlands County. The economies are based on health care/social assistance and agriculture.

3.18 Coastal Zone Management

The JIFE takes place in Polk and Highlands Counties. Despite not being in seaward counties, these counties are still considered coastal counties and subject to the Coastal Zone Management Act (CZMA). Land use plans, such as this EA, are assessed to determine if the particular plan is in conformity with Florida's CZMA. Other permits from the State of Florida that are typically required for actions in seaward counties are not required for non-seaward counties such as Polk and Highlands Counties.

3.19 Wildland Fire and Prescribed Burning

Many of the upland and wetland ecosystems at APAFR are ecosystems that are maintained by frequent fires – fires on intervals of once every 2 to 15 years. In areas where fire has been absent, fuels build up and leave the potential for large wildfires that are difficult and costly to contain. APAFR is therefore proactive by conducting prescribed burns within manageable burn units. APAFR's goal is fuel reduction, which is accomplished by a patchwork of burn units that are burned at various intervals. The objective is to have enough burn units burned to avoid large,

costly, and difficult-to-predict wildfires.

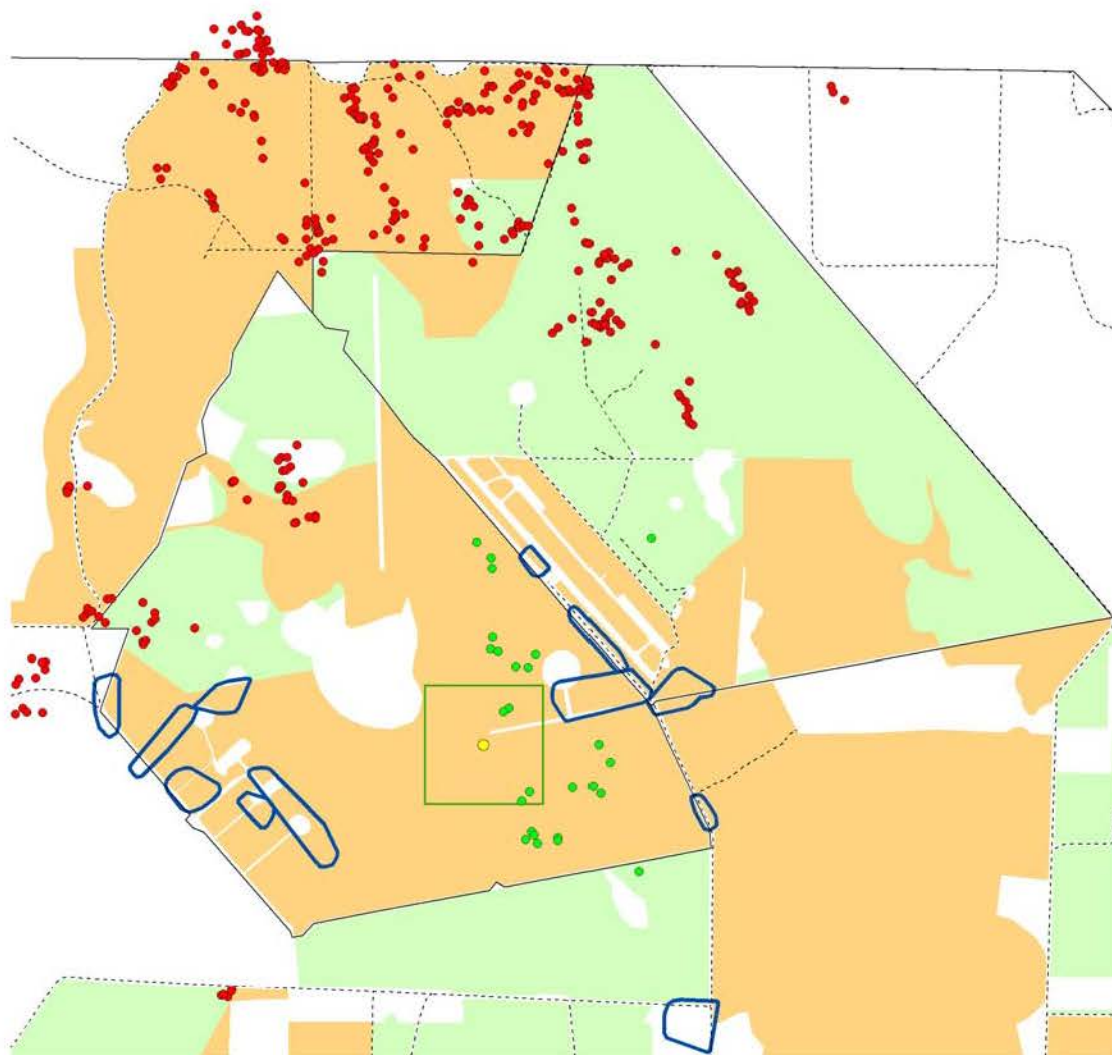
Prescribed burning supports ordnance deliveries for military training in both ordnance-impact areas and other non-ordnance-impact areas of the installation. In ordnance impact areas, the burn units result in lower fuel buildups so that a large wildfire is not possible. Also, in very recently burned areas – one year or less, there are so few fuels that a fire rarely carries from the ordnance ignition source. Outside of the ordnance impact area, prescribed burning helps to reduce fuels so that if a wildfire does leave a range, the wildfire is diminished in size and complexity so that it is easier to suppress. This is very important for ranges with no access for wildfire suppression teams. Reliance for containing a wildfire falls on the adjacent non-impact burn units. Also, prescribed burn units in non-ordnance impact areas reduce the potential for wildfires ignited by lightening strikes and carelessness, such as smoking and unauthorized campfires.

Ordnance deliveries described in the Proposed Action and Alternatives A and B occur in the North Conventional, North Tactical, and South Tactical Ranges. The North Conventional Range is a high-explosive range with the potential for dangerous, unexploded ordnance; fire personnel do not enter the range to apply prescribed fire or to suppress wildfires. Prescribed-fire crews apply prescribed fire around the perimeter of the North Conventional Range each winter in an effort to keep future ordnance-ignited wildfires within the range. Sometimes, if fuel buildups are high in the range, the perimeter area burn is designed to burn more into the interior. Some years a perimeter burn is not conducted around all of the perimeter because the adjacent off-impact-range burn units have been burned and therefore have low fuel loads. The current prescribed burn situation for the North Conventional Range shows about 90% of the range being burned recently (January or February 2005) or within the last year (Figure 3.19-1). The off-impact burn units on the northwest perimeter of the impact range were burned during January and February 2005 as well.

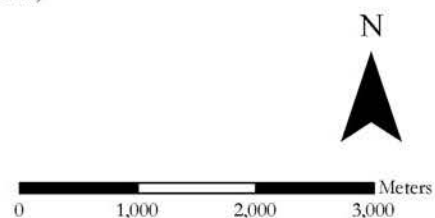
About 95% of the North Tactical Range was either prescribe-burned during January and February 2005 or within the last year.

About 80% of the South Tactical Range was prescribe-burned during January and February 2005 or within the last year. A portion of the range that was burned within the last year is scheduled to be burned again in April 2005 (Figure 3.19-2). Most of the new SDZ for the new mortar impact area is encompassed by the April 2005 burn.

The HIMARS RRPRs create a large flame signature when launched from the trucks. This is a potential ignition source for a wildfire. RRPRs are launched in Oscar Range, which was burned in April 2005, and in FP B-4, FP17, and FP18 which were burned in January of 2005.



- Historic Grasshopper Sparrow Sitings (Birds Could Occur Anywhere in These Areas)
- RCW Cavity Trees
- 2004 Scrubjay Territories
- Hellfire Target Center
- Hellfire Target Box
- Roads
- Boundary
- Recently Burned Areas (January or February)
- Low Burn Potential (Burned Last Year)



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Figure 3.19-1. Recently Burned and Low-Burn-Potential Locations for the North Conventional and North Tactical Ranges.

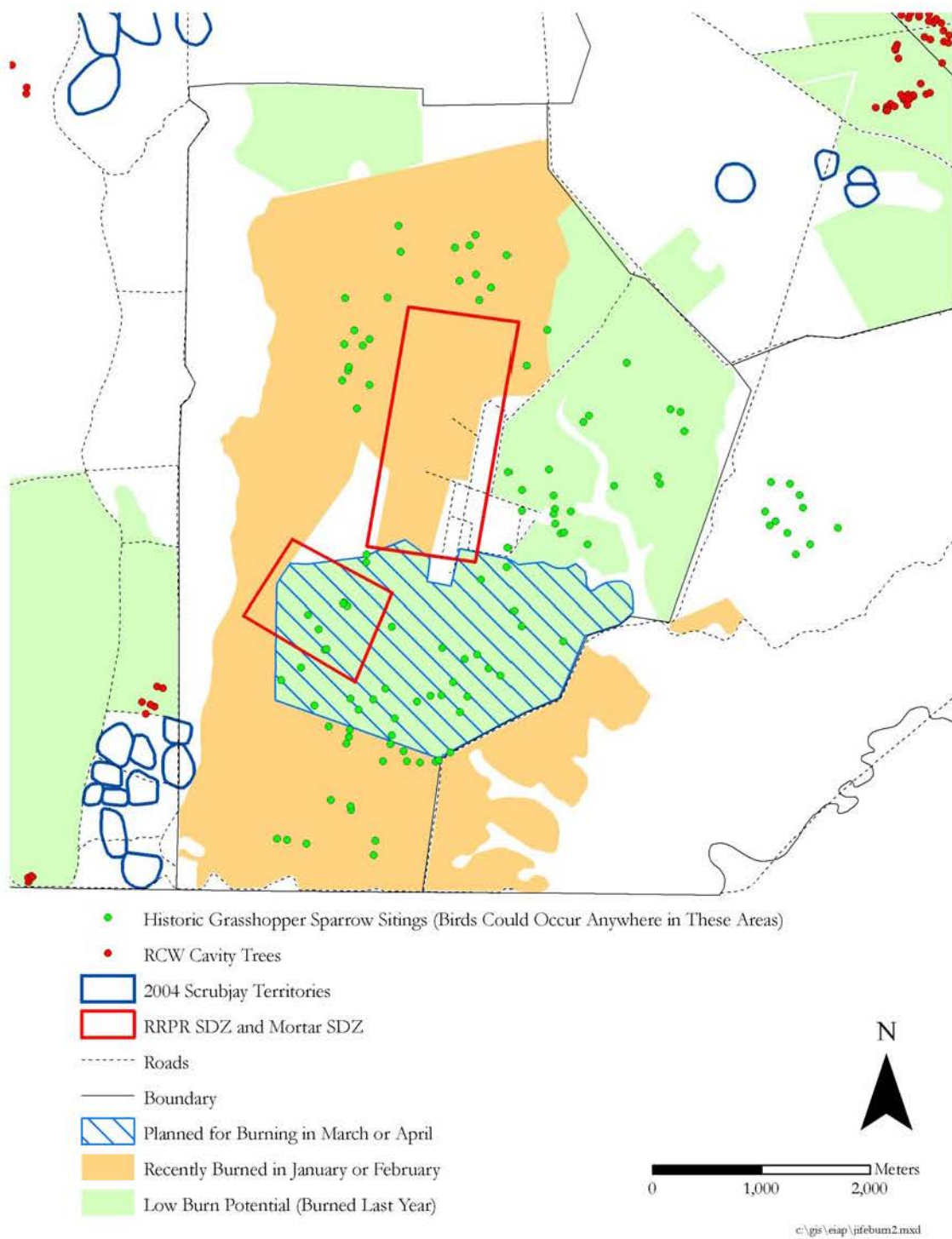


Figure 3.19-2. Recently Burned and Low-Burn-Potential Locations for the South Tactical Range.

4.0 ENVIRONMENTAL CONSEQUENCES

4.1 Airspace and Aircraft Operations

In FY 1994, there were a total of 25,698 aircraft operations at APAFR. An environmental impact analysis of this rate and an increase to 62,271 operations indicates that APAFR's airspace can accommodate this level of activity without environmental impacts (USAF 1996). The Proposed Action will slightly increase the amount of air operations.

4.2 Safety

Environmental impact analysis of safety issues for all ongoing training, which annually totals more than 25,000 aircraft operations, indicates that there are no environmental impacts relative to safety for ongoing operations (USAF 1996). Under all alternatives, there are expected to be no environmental impacts relative to fire and crash rescue response, flight risks, or ground risks. The JIFE exercise inherently takes measures to ensure the safety of TACPs in HE impact areas.

4.3 Noise

4.3.1 Proposed Action Alternative

The TACPs, FOs, artillery, mortar, and HIMARS crews are all subjected to continuous and impulse noise levels that are considered annoying. However, these noise levels are considered part of the training and are compensated for by personnel being issued hearing protective equipment.

Noise generated from the 155 howitzers, 81mm and 120mm mortars firing from new locations was analyzed using the single-event noise metric "decibels at blast peak (dBP)" using the noise modeling program "BNoise" (US Army 2003). A noise study done in Virginia by the Naval Surface Warfare Center determined that noise levels below 115 dBP are unlikely to result in complaints from residents (Pater 1976). These findings are supported by extensive experience in subsequent years at other locations (Dr William Russell, personal communication).

Of all ground-artillery firing locations and weapons types analyzed, only the 120 mm mortar firing from South Tactical Range's mortar-firing points projected noise levels greater than 115 dBP beyond APAFR boundaries. Off-range areas that are affected by noise levels greater than 115 dBP are used for cattle grazing and are not considered to be highly noise-sensitive. Artillery noise is expected to reach 118 dBP at the boundary of the range with noise levels dropping to below 115 dBP at approximately 300 meters beyond the installation's boundary. Cattle grazing in this area during the exercise may be frightened by JIFE artillery noise; however, cattle in the area have been exposed to military noise in the past and are not expected to show strong reactions to JIFE noise. No significant noise impacts are expected to occur as a result of the Proposed Action.

Noise levels in the APAFR cantonment area, Avon Park Correctional Institution, and the Youth Academy area are expected to exceed 112 dBP, but below 115 dBP during the howitzer firing from the Karen DZ. Human receptors in these areas are subjected to noticeable noise

levels, but below the threshold that typically elicits complaints. This noise is a one-day, one-time event.

4.3.2 Alternative A

Noise impacts associated with Alternative A would be approximately the same as the Proposed Action. Under Alternative A, mortars would fire only from the West FP area and the 155mm howitzers would fire only from the eastern half of the Joan DZ. Firing from these locations does not significantly alter the distance between firing points and the installation's boundary or the cantonment area from what would occur under the Proposed Action. Noise levels at and beyond the installation's boundary and within the cantonment area are not expected to differ from those listed for the Proposed Action. No significant noise impacts are expected to occur as a result of Alternative A.

4.3.3 Alternative B

Alternative B has the same impacts as the proposed action.

4.3.4 No-Action Alternative

New noise is not created with the No-Action Alternative.

4.4 Hazardous Materials and Waste

This exercise should generate an insignificant amount of hazardous material, hazardous waste and solid waste. The exercise will be conducted over a short period in comparison to the complete year. Only emergency vehicle and aircraft maintenance will occur during this period. It is expected that only one drum of maintenance rags and absorbent material will be generated. Routine maintenance will have occurred prior to the equipment's arriving on site. Any unused materials will be carried back to the unit's home installation. If a spill were to occur, it will be contained by the unit and reported to the Environmental Flight at APAFR for cleanup. The exercise will generate solid waste; however, trash is collected on a predetermined schedule and no change to the schedule is needed due to the limited quantity that will be generated.

The Proposed Action, Alternatives A and B, and the No-Action Alternative will not impact the hazardous material, solid waste, or hazardous waste programs at APAFR.

4.5 Environmental Restoration

The only impact may occur at Landfill 89, which is located adjacent to the South Tactical Range's high-explosive area. An explosive munition landing in the landfill may cause exposure of the buried solid waste (demilitarized munitions). The landfill would be examined after the completion of the exercise and covered with soil if needed. The HMX and RDX should have been expended with the munition's exploding. No contamination is to be expected; however, the potential does exist for UXO constituents/contaminants to migrate to the soil. Low lying wetlands may also have the potential to be contaminated.

The Proposed Action and Alternatives A and B will have minimal impact on the restoration program.

4.6 Air Quality

APAFR is in an attainment area. The increased burning of fossil fuels during this exercise will not cause the area to be classified as non-attainment. The military aircraft and vehicles are exempt from emissions-reporting under the Clean Air Act. The munitions expended will result in an increase of air emission from these larger types of munitions; however, the emission totals will not vary from previous years by a significant amount because small-arms munitions will be reduced. The units participating in the exercise will provide expended munitions reports to the Environmental Flight for inclusion in the TRI DDS reporting system. Units will be firing into areas that have been recently prescribe-burned. While some wildfires will occur, the air emissions will not have a significant impact on the air quality in the region. Prescribed burning is currently exempted from Clean Air Act reporting.

The Proposed Action, Alternatives A nd B, and the No Action Alternative of this exercise will not impact the air quality at or near APAFR.

4.7 Geology and Soils

Soils will be affected primarily in three ways: 1) soil displacement caused by the delivery of explosive ordnance, 2) soil rutting and erosion, and 3) soil contamination.

Soil displacement created by the delivery of explosive ordnance is expected to occur in the North Conventional and the South Tactical Ranges. Ordnance which land in wetland soils may displace soil, vegetation and water upon impact. Impact craters due to ordnance are typically elliptical with the relative shape of the ellipse being dependent on the angle of impact. Displaced soil from ordnance-impact craters usually forms a slightly raised rim around the crater. The craters tend to fill back in over time, and craters that occur within target features are restored incidentally via disking during regular target maintenance.

Increased vehicle activity on the convoy route and elsewhere would be expected to result in an increase in soil erosion, especially on disturbed sites. Direct impacts include soil compaction of surface soils and disruption of soil integrity due to these activities. Indirect impacts are those due to disturbance of the ground-cover vegetation by vehicular activity, which promotes soil erosion. The predominant soils are considered highly erodible and have low-organic matter content and are subject to wind and water erosion in the North Tactical Range. Ground disturbance by vehicles increases erosion potential as vegetative cover is removed, leaving the soils susceptible to erosion along the convey route, and at West and East Mortar Firing Areas. Past disking of the convoy route over many years has created an erosional drainage ditch along the northern boundary of the airfield. This artificial drainage ditch has acted to transport Myakka sands downslope where it has deposited a sandy delta over hydric mucky soils on side slopes of the Bombing Range Ridge.

Soil may be contaminated by direct contact with ordnance residue or by contact with storm water, which has been contaminated by ordnance residue. There is potential for additional minor soil contamination on the impact areas.

4.8 Water Resources

4.8.1 Proposed Action

The Proposed Action does not impact the Floridan and intermediate aquifers at APAFR. The exercise is not expected to contribute any measurable amount of explosive residue and metals associated with ordnance to the ground water or surface water.

Increasing the number of Hellfire missiles and RRPRs in the North Conventional Range is not expected to affect the water resources because the amount of ordnance added from this exercise is small and the impacts from the ordnance are minor when considering the current amount of ordnance delivered to this range annually. The same results are expected for the RRPRs entering the inert portion of the South Tactical Range.

The Proposed Action has a minor physical impact to the water table at APAFR in the South Tactical Range. The Proposed Action impacts the surface-water retention in the South Tactical Range where the mortars impact. Specifically, the craters created by the mortars result in many depressions. The nearer to the targets, the more craters form, so that collectively they result in wider and deeper depressions. The farther from the targets, the craters are more isolated and result in more scattered depressions. In uplands, the craters will retain surface water longer because the surface water no longer drains as effectively by sheet flow. The end result is a slightly more mesic upland site with a stronger potential to reach the ground water and the associated surficial aquifer due to the retention. Surface runoff in the immediate area will have more sediment, but given the strong upland vegetative cover, the sediment will easily become trapped in the immediate area of the craters and surface water will be filtered. Given that this is a one-time exercise, the craters will revegetate resulting in little potential for sedimentation. Very few craters are expected to occur in the wetlands because the targets are 125 meters or more from the closest wetland.

The firing points used by the 155mm howitzers involve wetlands, but the howitzers are anticipated to train outside of them. This is because the wetlands are occupied by trees – either pine plantations, volunteer pine, or oaks, and these trees obstruct firing from the howitzers. By choosing ground for unobstructed fire, the howitzers train in uplands by default. FP21 and FP22 have open marshes for unobstructed fire. These are signed as wetlands along the tank trail access road and can easily be avoided, even with the new 300 meter diameter.

The HIMARs may fire in wetlands on Oscar Range, but they would fire from existing strafe lines that are under a Section 404 permit.

4.8.2 Alternatives A And B.

The alternatives have the same results as the Proposed Action for not contributing measurable amounts of explosive residue and metals to the ground water or surface water. The alternatives have the same results as the Proposed Action when expanding the firing points. Large craters will be created near the target, with fewer, smaller craters away from the target. The craters will create more open water in the wetlands resulting in exposing ground water to the surface. Overall, the wetlands will become more mesic. Short term, more sedimentation is possible, but again the surrounding wetlands will filter much of the sediment. Being a one-time training event, the craters will revegetate.

4.8.3 No-Action Alternative

The No-Action Alternative does not impact water resources.

4.9 Vegetation

North Ranges

Ordnance may displace vegetation upon impact, but are expected to be minor in the Proposed Action. Impact craters due to ordnance are typically elliptical with the relative shape of the ellipse being dependent on the angle of impact. Displaced soil from ordnance-impact craters usually forms a slightly raised rim around the crater. The impact craters often fill in with early successional wet-adapted plants while the raised rims around the surface of the crater often become overgrown with saw-palmetto (*Serenoa repens*) or other shrubs.

South Tactical Range (Echo)

Florida dry-prairie vegetation, the preferred habitat of the FGS, could potentially be affected by activities within the RRPR surface-danger zone, the 120mm surface-danger zone and the West and East MFA. There are approximately 6,789 acres of Florida dry prairie mapped within the southern ranges (Echo/Charlie ranges). Of this approximately 515-517 acres may be affected, of which 350 acres of prairie occurs within the RRPR area, 144 acres of prairie occurs within the 120mm area, 10 acres occurs within West MFA, and 8 acres occurs within East MFA.

Usage of West MFA would result in the loss of a permanent long-term vegetation monitoring transect. Vehicular activity would disturb the native dry prairie groundcover vegetation. At APAFR there are 1,020 meter square plots that are utilized for long-term monitoring of vegetation. Of these 1,020 permanent plots, 210 were established in 1997 to monitor Florida dry prairie vegetation (i.e. Florida Grasshopper Sparrow habitat). Using the West MFA would destroy 10 of these 210 long-term plots, furthermore only 40 of the 210 plots are located on Oldsmar soils, so there would be a loss of 10 of the 40 plots. Establishing new plots would not compensate for the loss of data from these plots which date back to 1997 (nine years worth of sample data). This loss can not be compensated by establishing a new set of plots at a different location. Approximately ten acres of Florida dry prairie would potentially be impacted.

Usage of East MFA would result in minimal disturbance of approximately 8 acres of Florida dry-prairie vegetation primarily due to vehicular activity, bivouacking and other associated activities at the firing point and should recover.

4.9.1 Hairy jointweed

Hairy jointweed is known to occur within the North Conventional and South Tactical Ranges; however, the plant is not known to be located in these ranges where the JIFE will be conducted. The plants are located at the southwest edge of the North Tactical Range and extreme northeast edge of the North Conventional Range; therefore, there would be no potential impact this species. Potential populations only marginally are encompassed by the FP9-11. This species exist in fire driven ecosystems and are not adversely impacted by mission-created fires.

4.9.2 Pigeonwing

Pigeonwing patches exist to the northwest outside of North Conventional Range and to the western edge of the North Tactical Range impact areas. The plant is not known to be located in areas where the JIFE will be conducted. APAFR efforts to control fires to within the impact-area boundaries through established firebreaks, as well as the plant's adaptation to periodic burning, minimize the potential for the training missions to alter the pigeonwing population on APAFR; therefore, no effects to pigeonwing would be expected to occur.

4.10 Fish and Wildlife Species

Table 4.10-1 Potential Impacts to Federally Listed Animal and Plant Species

Common Name	Potential Impacts	Determination
<i>Florida grasshopper sparrow</i>	Noise and wildfire	<i>Likely to adversely affect</i>
<i>Red-cockaded woodpecker</i>	Noise and wildfire	<i>Likely to adversely affect</i>
Wood stork	Noise	May affect, but not likely to adversely affect
Florida panther	Noise	May affect, but not likely to adversely affect
<i>Florida scrub jay</i>	Noise and wildfire	<i>Likely to adversely affect</i>
Audubon's crested caracara	No affect	May affect, but not likely to adversely affect
Bald eagle	No affect	May affect, but not likely to adversely affect
Eastern indigo snake	Noise and wildfire	<i>Likely to adversely affect</i>
Wireweed	Wildfire	No affect
Pigeonwing	Wildfire	No affect

APAFR is currently in Section 7 consultation with the USFWS for threatened and endangered species as encompassed by the JIFE. APAFR has submitted a biological assessment and is awaiting a biological opinion from the USFWS.

4.10.1 Florida Grasshopper Sparrow

FGSs have been monitored at APAFR since 1996 by conducting annual point count surveys. Surveys provide population trends. As noted in Table 4.10-1, FGS populations have declined. The reason for the decline in the sparrow population has not been identified. A group has been established consisting of the FWS, ABS, FFWCC, and the APAFR biological staff to study this decline. The individual military activities of the proposed JIFE are very similar to activities that

take place at APAFR on a regular basis; however, the JIFE is a “joint activity” that brings all the military activities together at one point in time. Also, the JIFE will be conducted during FGS breeding season.

The exercise will be conducted in the FGS Habitat Management Units Charlie/Echo HMU (partly located in the South Tactical Range) and Bravo/Foxtrot HMU (entirely located in the North Conventional Range) as identified in the *Plan for the Management of the Florida Grasshopper Sparrow, Florida Scrub-jay and Red-cockaded Woodpecker at Avon Park Air Force Range* (USAF 2000).

The entire Bravo/Foxtrot and Charlie/Echo Habitat Management Units have been ordnance impact areas for approximately 55 years and will continue to be used in this capacity. HE ordnance will be limited to the historical HE impact areas within the HMU. The only increase in activities in the Echo FGS HMU will be the introduction of a new 81 and 120mm mortar firing area (primarily on or immediately adjacent to existing roads), introduction of the delivery of 81 and 120mm ordnance into the HE area in South Tactical Range, and an increase in Hellfire missiles.

Potential impacts to FGSs that could occur within the South Tactical HE impact area includes: mortality of adults or young, or the destruction of nests from ordnance impact (although the impact would be very localized); degradation of habitat from ordnance; and degradation of habitat or mortality of adults or young due to ordnance-ignited wildfires.

Additionally, an increase in Hellfire missiles would likely contribute to an increase in the potential for ordnance-ignited wildfires in the impact area. Although any of these potential impacts could affect individual FGSs, the most potential for impacts would likely be due to an increase in ordnance-ignited wildfires. Although wildfires can result in the loss of nests, chicks, or fledglings, overall, fires have contributed positively to maintenance of the habitat for the FGS at APAFR. Although the potential for the loss of nests, chicks, or fledglings from ordnance-ignited wildfires exists, the species is adapted to frequent fire events. Ordnance-ignited wildfire in the impact areas has likely contributed to the maintenance of the habitat in a suitable state for the FGS. Within Charlie/Echo FGS HMUs, APAFR conducts prescribed fires when ordnance-ignited fires do not burn the majority of the grasslands within the HMUs; therefore, an increase in the probability of fires, from the JIFE, that would spread into the Charlie/Echo HMU would not be expected to lead to negative impacts and depending on the increase in the incidence of such fires, may be considered desirable in maintaining the habitat. The current fuel loads in the North Conventional Range are low with low probabilities for the ignition and spread of fire. The current fuel loads in the South Tactical Range are variable from low to moderate. If the South Tactical impact area is prescribe burned in March, the potential for adverse effects from ordnance-ignited wildfires is very negligible.

Military noise effects to wildlife, including effects of aircraft noise, are complex and variable within and among species depending on time of day, season, life history, individuals, and habituation (USACE 1996). To date, there are no scientific studies reporting negative impacts to the FGS from military noise.

Therefore, FGSs in the area during the JIFE are likely to be adversely effected. However, this effect is thought to be primarily harassment only. No lethal takes of the FGS are expected. Therefore, the population of the FGS will not be jeopardized.

4.10.2 Red-cockaded woodpecker

The RCW HMUs overlap with portions of the North Conventional, North Tactical, and South Conventional Ranges. RCWs have not been identified the South Tactical Range HE area. Potential disturbance to or degradation of potential habitat would be very limited to a relatively small area. Based on 2003 survey data, few mission activities are in close proximity to an active RCW cluster. No RCW clusters are located within the South Tactical Range. The active RCW clusters located on South Conventional Range are located north of Kissimmee Road. JIFE activities will be conducted south of Kissimmee Road. RCW clusters located in North Conventional Range are located one mile from the Hell-Fire missile targets and one-half mile from the tactical/laser targets. In the North Tactical Range, RCW clusters are located near tactical/laser targets; however, military operations will not be conducted in pine forest areas where RCW are likely.

Potential effects would include damage to or loss of a cavity (or foraging) tree, or disturbance to birds due to ordnance-ignited wildfires. This potential would exist for the clusters nearest the targets.

APAFR estimated that over a nine-year period (1992 to 2000), nine cavity trees were lost from prescribed or ordnance-ignited fire, training (including target maintenance), beetle infestations, or other habitat management activities. Although, based on APAFR data, it appears unlikely that individual woodpeckers are lost during fire events (USFWS 2001) or that a fire that reached an active cluster could potentially cause the death of a cavity tree or foraging tree or the loss of a nest. Fires at APAFR have historically been more beneficial than adverse. Prescribed burning has been the primary technique used to manage the native longleaf pine forests over the past 20 years. In accordance with the ESMP, all current and potential habitats are burned every two to three years to maintain a low density of hardwoods. Ordnance-ignited have assisted in maintenance of the habitat required by the RCW. The Hellfire missile target area is not within a RCW HMU or near any known RCW cavity trees or clusters. The only potential impact to the RCW from the use of Hellfire missiles would be related to an increase in the occurrence of wildfires that would reach the northern part of the impact area where active clusters and cavity trees are located. The potential for this, however, is very minimal due to recent ordnance-ignited wildfires and low fuel build-up in the northern part of the impact area where the northern RCW cluster is located and low fuel build-up around the Hellfire missile target. Furthermore, the cluster near the tactical/laser targets was prescribe burned in December 2004 as a perimeter buffer burn for the North Conventional Range.

Effects to the monitoring and management initiatives for the RCW described in the ESMP will not be impacted by this short duration activity.

Due to RCW clusters being located in the vicinity of the JIFE, the JIFE is likely to adversely affect the RCW from noise or the possibility of a mission ignited wildfire. However, this affect is seen as non-lethal, such as harassment.

4.10.3 Wood Stork

Wood storks have been observed throughout APAFR. There is the potential for wood storks to use habitat in the north and south range complexes. During University of Florida research aerial surveys conducted in 2003 for wading birds at APAFR, more wood storks were recorded outside of the range areas than inside. Out of the four aerial surveys, one stork was recorded inside the South Tectical Range, in the general vicinity of the existing targets. The probability of adverse impact to wood storks on APAFR during the proposed JIFE would be unlikely. Larger areas of more suitable habitat which attract the wood stork are outside of the impact areas. Also, storks will leave the existing target areas at the initiation of the JIFE or the onset of ordnance delivery. Therefore, while there is the potential for the disturbance or harm to individual wood storks from the proposed training, the proposed training would not be expected to adversely impact the species. There are no scientific studies reporting wood storks being affected by aircraft noise.

4.10.4 Florida Panther

Florida panthers are not known to occur at APAFR on a regular basis; however, there is the potential for them to occasionally pass through the installation. The occurrence of a panther within the existing ranges would be an extremely rare and transitory event; therefore, it is likely that there would be no effects to this species as a result of JIFE. Because it is possible that panthers traverse APAFR, some exposure to noise from low flying aircraft and deployment of munitions is possible. Since the Florida panther is only known to traverse through APAFR, changes in habitat use would not be expected from occasional exposure to low-level aircraft and deployment of ordnance. The JIFE may affect, but is not likely to adversely affect the Florida panther.

4.10.5 Florida Scrub-jay

The FSJ HMUs overlap with portions of three of the impact areas—North Conventional, North Tactical, and South Tactical Ranges. FSJ territories have been recorded near some existing targets in all of the impact areas except for the South Tactical Range. Although the South Conventional impact area is not within an HMU, birds have been recorded in the general vicinity of some targets. Based on the 2003 data only, there were a total of five mapped territories that overlapped with targets (three in North Conventional Range, one in North Tactical Range, and one in South Conventional Range). Potential impacts to FSJs within the impact areas include: bird mortality or the destruction of nests from ordnance impact if birds are at the immediate location of ordnance, degradation of habitat from ordnance impact, and degradation of habitat or mortality of young due to ordnance-ignited wildfires.

If a fire reached an occupied FSJ territory during the nesting season, the potential would exist for loss of eggs or nestlings. For the years 1994 through 2000, APAFR reported that eight nests were lost due to wildfire. Additionally, food resources potentially would be temporarily diminished, as fires tend to reduce acorn production for several years. Recent fires also cause scrub habitat to temporarily have fewer nesting sites and escape cover. Although some loss of nests due to ordnance-ignited wildfire does occur, these fires also improve the habitat. Open sandy areas that are important to FSJs for foraging and acorn caching, and habitat with lower tree densities, are maintained.

Nest success was higher for FSJs on active ranges than for FSJs located outside of impact areas, although FSJ populations in both areas (i.e., active ranges and non-impact areas) have declined. Because the Hellfire missile target area is not within the FSJ HMUs or known FSJ territories, increased use of these missiles likely would not subject FSJ habitat to an increase in wildfires. It is reported that the biologist who observed local FSJs at the Navy's Pinecastle bombing range noted that the jays did not display obvious fright responses when ordnance fell or when aircraft flew over them. The biologist never observed FSJs fly away or show disrupted sentry behavior due to the noises produced by the training missions at the Pinecastle Range. It is possible that FSJs in the Ocala National Forest had acclimated or become conditioned to accept these noise patterns, and the same may be true for FSJs located on APAFR.

The JIFE training will potentially lead to a small increase in the number of FSJ nests (including eggs or young) lost due to ordnance-ignited wildfire, but should not cause a permanent reduction in reproduction or habitat for the FSJ on APAFR. The JIFE is of short duration and has potential for causing an ordnance ignited wildfire for a short time. The monitoring and management conducted at APAFR for the FSJ does not indicate that the military mission has had a detrimental population affect on the FSJ.

Since the JIFE will be conducted during breeding season, there is a potential that the FSJ may be adversely affected by noise or mission ignited fire.

4.10.6 Crested Caracara

Crested caracaras are occasionally seen at APAFR. The caracara nests that have been recorded at APAFR are in the vicinity of the Kissimmee River and the installation's Main Gate, but there have been more recorded in the vicinity of existing training areas, including helicopter landing zones, to be used during the JIFE. The potential exists, however, for caracaras to use habitat within existing training areas. Although there is the potential for disturbance or harm to individual caracaras if they are using the immediate areas during JIFE, the probability for such an occurrence would likely be small. Additionally, caracaras may leave the JIFE areas at the initiation of flying or the onset of ordnance delivery. Noise exposures from low-level aircraft flights are likely for the caracara if they happen to be in the JIFE area. Since this species utilizes habitats on APAFR, the birds would have already acclimated to airplane noise. Increased exposure to noise may affect, but is not likely to adversely affect caracaras on APAFR.

4.10.7 Bald Eagle

No bald eagle nests have been recorded in the vicinity of the range complexes or the JIFE. The potential exists, however, for eagles to soar over the area. Although the potential for disturbance or harm to individual eagles exists, the probability for such an occurrence would likely be small. The actual area of JIFE is small. Additionally, bald eagles may leave the existing target areas at the initiation of flying and the onset of ordnance delivery. Therefore, while there is the potential for the disturbance or harm to individual birds from the proposed JIFE training, the likelihood is very small. Two eagle nests recorded in 2004, near Frostproof Road, were approximately 5 miles from the north range complex. Eagles at APAFR tend to nest away from existing target areas; thus, no impacts from JIFE noise would be expected. Therefore, the JIFE may affect but is not likely to adversely affect the eagles on APAFR.

4.10.8 Eastern Indigo Snake

Indigo snakes occur throughout APAFR. Based on data from the first few years of an ongoing study at APAFR (Legare and Breininger 2002), radio-tagged indigo snakes have been recorded in the general vicinity of the southwest corner of the North Tactical Range. Because they use a variety of habitats and have large home ranges, indigo snakes may occur in any of the range complexes. The potential exists for direct effects to individual indigo snakes if they are located in the target area during the JIFE at the time of ordnance delivery. The Legare and Breininger research indicates that most indigo snakes are able to escape fire; however, in some cases an individual snakes might perish. However, because indigo snakes use a variety of fire-adapted habitats, an increase in the probability of fires within the impact areas would not be expected to adversely impact the species overall.

There are no scientific studies reporting low-level aircraft noise impacts to the indigo snake. Snakes do not have an external ear, middle ear, or tympanic membrane (eardrum). Instead, they use a small ossicle (ear bone), called the “columella” to detect vibrations of sound waves conducted through the ground. They are able to pick up some sound waves conducted through the air, but only at very low frequencies. It is unknown if snakes are able to distinguish between aircraft and thunder with very low-level noise frequencies and vibration; or if they display differential behaviors.

4.11 Grazing Management

Cattle grazing will not be allowed in either of these range complexes during the exercise, therefore eliminating and hazard to livestock. Because the training event occurs in a relatively short period of time and will only occur during part of any one day, access onto the installation will be limited above normal operational activities but will not be long term in nature. Therefore cattle lessee's access onto the installation will not be unduly restricted. Ground disturbance will occur within the proposed 81 and 120mm mortar firing areas. This will slightly reduce forage availability for livestock within this area for a short period of time.

4.12 Invasive Plant Management

Because there are no invasive plants within these areas there should be no environmental consequence from this action.

4.13 Timber Management

No adverse impacts to forest resources are foreseen with the Proposed Action or Alternatives A and B.

4.14 Recreation

The effects on recreation would include possible closing of the portion of the National Scenic Trail on APAFR, along with Management Unit 10a, at both trailheads during the exercise. It will be necessary to inform the public of this (through a web site and telephone recorded message) prior to the week of the exercise. The only other known impact on recreation activities would be the need to possibly close the Public Recreation Area on the weekend due to the amount of vehicle traffic on the main roads during the weekend of preparation.

4.15 Military Training

The proposed action and alternatives retain all of the previously assessed and currently authorized training and ordnance, with additional training occurring as outlined in the proposed action. Air operations and ordnance delivery training at APAFR will slightly increase with the addition of a maximum of two JIFE exercises per year; each lasting five days in duration. The proposed action presents a very minor increase in military activity and is not expected to have an impact on the training environment.

4.16 Cultural Resources

APAFR entered into a Section 106 consultation as per the NHPA via letter correspondence to the State Historic Preservation Office (SHPO) on 27 January 2005 (see Appendix B). APAFR determined no adverse affect to cultural or historic resources. Based on the information provided concerning the proposed action and the previously surveyed areas, the SHPO concurred with a letter dated 25 February 2005. The Phase I survey of the Karen and Joan Drop Zones was conducted after the clearance by the SHPO to further identify any potential cultural resources in the proposed project area. No potential cultural resources were identified. APAFR is currently in tribal consultation as per the NHPA.

4.16.1 Proposed Action

All of the areas effected by the proposed JIFE training at APAFR, which can be safely investigated, have been subjected to Phase I cultural resources assessment surveys. Within these previously surveyed areas, no cultural resources eligible for listing in the NRHP have been identified. The proposed action will have no effect on cultural resources.

4.16.2 Alternative A

The effects for alternative A are expected to be the same as the proposed actions. There is no anticipated effect from the use of the AC-130 HE target in the South Tactical Range by mortars. There is no change in the determination of the West MP location.

4.16.3 Alternative B

The effects of Alternative B are expected to be the same as the proposed action.

4.16.4 No-Action Alternative

No effect on significant cultural resources.

Table 4.16.1-1 Effects and Recommendations for Cultural Resources

Proposed Action	Effect to Cultural Resources	Recommendation
Concurrent Use of Air Assets with Ground Mortar and Artillery Assets	None	None
TACPs and FOs in the High Explosive Area in the North Conventional Range (Bravo)	None	None
Increase in HE Hellfire Missiles	None	None
Firing 155mm Howitzers from the Northern Half of the Karen Drop Zone	None	None
Increase in RRPRs and Use of RRPRs in the South Tactical Range	None	None
Firing HIMARS from Oscar Range and Firing Points 17, 18, and B-4	None	None
Establish Two New 81mm and 120mm Mortar Firing Areas for the South Tactical Range (Echo)	None	None
Introduction of 81mm and 120mm Ordnance in the High Explosive Area of the South Tactical Range	None	None
Extending the 155mm Howitzers Beyond the 100 Meter Set-up Radius	None	None

4.17 Socio-economic Resources

The JIFE is not expected to have any social-economic effects to Highland and Polk counties. The JIFE is one of many military exercises that occurs within any given year. Collectively, these exercises stimulate the economy with goods and services, but given the average size and short duration of the JIFE, the JIFE's financial contribution is less than 5% of the annual military training exercises. The Proposed Action, Alternatives A and B, and the No-Action Alternative does not effect the socio-economic resources.

4.18 Coastal Zone Management

The Proposed Action, Alternatives A and B, and the No-Action Alternative are in compliance with the Florida Coastal Zone Management Plan and have no adverse affects on coastal zones.

4.19 Wildland Fire and Prescribed Burning

The potential for wildfires caused by ordnance is dependant on three factors: 1) weather, 2) potential to ignite a fire from the ignition source, 3) potential for the fire to spread from the ignition location.

For weather, the current weather forecast for the dates leading up to and during the JIFE is drier and cooler than average resulting in an above normal fire potential (USFS 2005). From the weather data alone, if there is an ignition and fuel source, there is potential for fire.

The potential for ignition varies by impact range and location. For the three impact ranges involved in the exercise, the potential for ignition and spread is low because so many portions of the ranges have been recently burned within the last year. Granted, most prescribed burns and wildfires leave unburned pockets of fuel that have a potential to ignite, but these pockets are generally small islands that have limited spread potential. Some larger burn units within the impact ranges that have not been burned within the last year may ignite and burn from ordnance, but again, these are isolated and contained by previous burns.

The potential for fire spread in Oscar Range is negliable because it was burned in April 2005.

In summary, the JIFE may cause isolated pockets of unburned fuel to ignite in the impact ranges for the Proposed Actions and Alternatives A and B. The potential for fire spread is minimal because the unburned areas consist of small islands of fuel. Oscar Range presents the least potential for a wildfire because it was burned most recently. Given the low potential for fire spread, APAFR wildfire suppression teams will not need to be available during the JIFE exercise.

The No-Action Alternative has slightly less potential to start wildfires in the North Conventional and South Tactical Ranges because less ordnance is fired into the ranges. Fire potential in Oscar Range is not existent because the HIMARS do not fire from Oscar Range.

4.20 Environmental Justice

Environmental justice was established by Executive Order 12898 (1994) in an effort to prevent federal activities from deliberately excluding or subjecting minority and low income populations to situations that adversely affect human health or the environment. Section 2-2 reads "Each Federal agency shall conduct its programs, policies, and activities that substantially affect human health or the environment, in a manner that ensures that such programs, policies, and activities do not have the effect on excluding persons (including populations) from participation in, denying persons (including populations) the benefits of, or subjecting persons (including populations) to discrimination under, such programs, policies, and activities, because of their race, color, or

national origin.” Potential impacts that may involve environmental justice entails determining the Region of Influence (ROI) by the proposed action and alternatives and then determining where, if any, minority or low income populations occur within the ROI. Census Tract 0157 in Polk County contains minority populations (USCB 2000). This tract encompasses the northwest ¼ of APAFR as well as property north and west of APAFR. The greatest concentration of the population of this tract is located at the Avon Park Correctional Institution and the Avon Park Youth Academy located west of the cantonment area. Individuals living in this tract will be subjected to noticeable noise levels during the exercise, but as determined in Section 4.3 Noise, the level of noise is not considered annoying. The impact of noise is the same for the Proposed Action and Alternatives A and B.

The No-Action Alternative only generates noise from existing infrastructure with the same effects as common exercises at APAFR.

4.21 Cumulative Impacts

Cumulative impacts considers the training and infrastructure that is new to APAFR via the JIFE: the training that is part of the JIFE that has been assessed in other NEPA documents (routine training) that APAFR receives from other exercises, and new, foreseen training that will occur at APAFR.

For the Proposed Action and Alternatives A and B, most of the JIFE replicates training that is very common to APAFR and is additive to impacts from other units training at APAFR. This is especially true for air-to-ground ordnance deliveries in the impact ranges. Aside from the Hellfire rockets, the ordnance is common and does not add appreciably to annual ordnance expended in these ranges nor wear and tear on targets. The Hellfire rocket expenditures are higher than the annual allotment and will wear and tear the sole HE target more than usual. The target will have to be replaced after the exercise. Firing mortars in the South Tactical range at the soft vehicles will also cause more wear and tear on the targets and they too will have to be replaced more frequently than with just the annual AC-130 gunships firing on them. The RRPRs add more to range clean up due to their size and number.

Impacts by ground vehicles and ground-based artillery are typical with annual use of the firing points, tank trails, and access roads. The JIFE does expand the firing points and creates new mortar firing areas, but this is a one time training event so these expansions are not available to other units after the JIFE exercise.

If the JIFE does become an annual or semi-annual event, use of the new infrastructure created for this one time exercise will have to be assessed for long term use and with the potential for other units using the infrastructure.

The Florida Army National Guard (FLANG) currently is conducting an EA for battalion-level training the Multiple Launch Rocket System – a mobile artillery battalion that fires the same RRPR as the HIMARS. The proposed MLRS action and alternatives create maneuver areas in six locations of the range encompassing approximately 2,600 acres. This JIFE is not expected to affect the establishment of the battalion-level MLRS training. Again, if the JIFE becomes an

annual or biannual training, there is potential for interaction ranging from shared infrastructure to having the FLARNG battalion unit participating in the JIFE as an artillery asset.

The United States Navy (USN) currently has a draft EIS titled, *Environmental Impact Statement for Navy Air-to-Ground Training at Avon Park Air Force Range, Florida*, out for agency and public review. This EIS assesses impacts from air-to-ground delivery of HE ordnance on the South Tactical, North Tactical, and Alpha Ranges. Some or all of these ranges are considered, depending on alternative. Again, the JIFE is a one time training that lacks any interaction with the USN initiative. If, however, the JIFE becomes an annual or semi-annual event, infrastructure established for the initial JIFE can potentially be affected in that it is no longer accessible. This includes some firing points, mortar points, and tank trails no longer being accessible.

The No-Action Alternative add impacts as if the JIFE were a common exercise and does not add infrastructure capability for other exercises.

4.22 Short-Term Use and Long-Term Productivity

The short term use of resources has little impact on the longer-term productivity of APAFR. This is because there is very little impact to the infrastructure and resources at APAFR. Vehicles running over vegetation and marginal soil compaction or rutting is possible, but this is very limited and has ample recovery time. Craters are formed by the mortars in an area that lacks such depressions currently in the South Tactical Range. These will recover to some extent, but overall the craters will remain for several years and will change the vegetation composition and water holding capacities of the soils.

4.23 Irreversible and Irretrievable Commitment of Resources

Petroleum, oils, and wear and tear on vehicles and equipment will occur as is normal for such a training exercise. Expended ordnance and targeted vehicles will also be lost, although sizeable portions of metal are recycled. Most notably, the expanded portion of the HE area in the South Tactical Range creates limits on the type of training and access to that location of the range in the future after the JIFE. Typically inert ordnance will no longer be used in that portion of the range nor will access by personnel be allowed unless escorted by explosive ordnance disposal personnel.

4.24 Direct and Indirect Effects

Direct effects include noise generated from weapons, vehicles, and impacting and/or exploding ordnance. Emissions from vehicles and ordnance are also a direct effect. Ground and vegetation disturbance is a direct effect from vehicles, weapon set-up, and ordnance. Indirect effects include ordnance-ignited wildfires, soil displacement, and limited personnel access and ordnance use in the expanded HE impact area.

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GLOSSARY

81mm mortar. The M-29 is a medium sized mortar. A mortar is a simple tube that launches finned ammunition from the ground against ground-based targets. The ammunition is launched at high angles. The ammunition is high explosive, smoke, or illumination.

120mm mortar. The M-120 is a large sized mortar that functions the same as the 81mm mortar.

155mm howitzer. The M-198 is a large howitzer. A howitzer is a cannon that shoots at high angles. It shoots explosive shells, illumination, smoke, and white phosphorus.

A-10. The A-10 Thunderbolt II or “Warthog” is a fixed-wing attack aircraft. It is designed primarily to attack strongly armored tanks.

AC-130. The AC-130 Spectre is a fixed-wing attack gunship aircraft. It fires cannons and machine guns. The AC-130 is versatile for attacking several different types of ground-based targets.

AGM. Air-to-ground missile is a missile that is launched from the air and hits a target on the ground. The missile travels by a guidance system.

AH-1W. The Super Cobra is an attack helicopter armed with cannons, rockets, and missiles. It is designed to point attack a multitude of ground targets including armored targets.

ATGM. Anti-tank guided missile is a missile designed to penetrate the armor of tanks.

UH-1N. The Iroquois is utility helicopter commonly used for command, control, and coordination of ground assaults. It is also used for rescue and medical evacuations. It is armed with rockets and machine guns.

B-2. The B-2 Spirit or “Stealth” is a fixed-wing bomber. It is designed to deliver a variety of bombs from high altitudes on a variety of targets.

Bomb, Dummy Unit. An unguided inert bomb that is launched from the air and hits the ground.

F-15E. The F-15E Strike Eagle is a fixed-wing attack/air superiority fighter. It carries a variety of air-to-ground bombs that are used against several different types of ground-based targets. It has a cannon. It also carries air-to-air missiles.

F-16. The F-16 Fighting Falcon is a fixed light-weight fighter. It carries a variety of air-to-ground bombs, rockets, and missiles that are used against several different types of ground-based targets. It has a cannon. It also carries air-to-air missiles.

Fixed Wing. Aircraft that have non-rotating wings. The wings are stable.

FO. An observer operating with front line troops and trained to adjust ground or naval gunfire and pass back battlefield information. In the absence of a forward air controller, the observer may control close air support strikes.

HIMARS. The High Mobility Artillery Rocket System (HIMARS) is a wheeled rocket launcher. Rockets are self propelled missile that carries a payload. For training purposes, the HIMARS fires an inert reduced range practice rounds (RRPR).

HMMWV. The High Mobility Multi-Purpose Wheeled Vehicle (HMMWV) is a wheeled utility vehicle that transports a small number of personnel, supplies, and equipment.

Illumination. Illumination is a flare that illuminates the ground below. It is fired fire artillery and mortars.

M-60A. The M-60A Black Hawk is a medium size helicopter that is used to transport troops and cargo. Because it is also used for troop insertion and rescue missions, it is armed. One or two machine guns are common as well as options for anti-tank missiles, rockets, and cannons.

Rotary Wing. Aircraft that have wings that rotate and propel the aircraft.

RRPR. The reduced range practice rocket (RRPR) is an inert, concrete filled rocket with a small white phosphorus charge that ignites upon impact with the ground. The spotting charge is used to determine the accuracy of the rocket.

TACP. Tactical Air Controlling Party (TACP) is the air liaison to land forces and for the control of aircraft.

Tactical Operations Center. Tactical Operations Center (TOC) are locations where staff from a particular asset meets to communicate and coordinate with the central command post and their respective asset.

White Phosphorus. A type of ground-based ordnance that is used to ignite ground-based targets or used as a spotting round for artillery and mortars. White Phosphorus is also used in small amounts as a spotting charge for both air-to-ground and ground-to-ground ordnances.

APPENDIX A

JIFE NOISE LEVELS - 155 MM HOW, 81/ 120 MM MORTAR

FP loc	Weapon	Charge	dist to target	dist to listener	Listener Area	Unweighted peak *
Karen DZ	155 mm - M198	2	5332	2130**	cantonment East range	111
	"	"	"	4260	boundary	106.5
	"	"	"	1000	arbitrary distance	117
	"	"	"	2000	arbitrary distance	111.5
	"	"	"	4000	arbitrary distance	106.5
Joan DZ	155 mm - M198	2	7462	1530**	cantonment East range	112
	"	"	"	4260	boundary	104.5
	"	"	"	1000	arbitrary distance	116
	"	"	"	2000	arbitrary distance	109.5
	"	"	"	4000	arbitrary distance	104.5
MP West	81 mm mortar	2	2200	1750	South range boundary	112.5
	"	"	"	1000	arbitrary distance	116.5
	"	"	"	2000	arbitrary distance	111
	"	"	"	4000	arbitrary distance	105
	120 mm mortar	2	2200	1750	South range boundary	117
	"	"	"	1000	arbitrary distance	121
	"	"	"	2000	arbitrary distance	116
	"	"	"	4000	arbitrary distance	110
	81 mm mortar	2	2290	1470	South range boundary	113
	"	"	"	1000	arbitrary distance	116
MP East	"	"	"	2000	arbitrary distance	111
	"	"	"	4000	arbitrary distance	105
	120 mm mortar	2	2200	1750	South range boundary	118
	"	"	"	1000	arbitrary distance	120
	"	"	"	2000	arbitrary distance	115.5
	"	"	"	4000	arbitrary distance	110

*Peak dB reading (1S.D. above mean event sound level); Weighing refers to mathematically emphasizing mid-range frequencies noise.

**Sound calculated based on closest possible firing point to given DZ.

